PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)

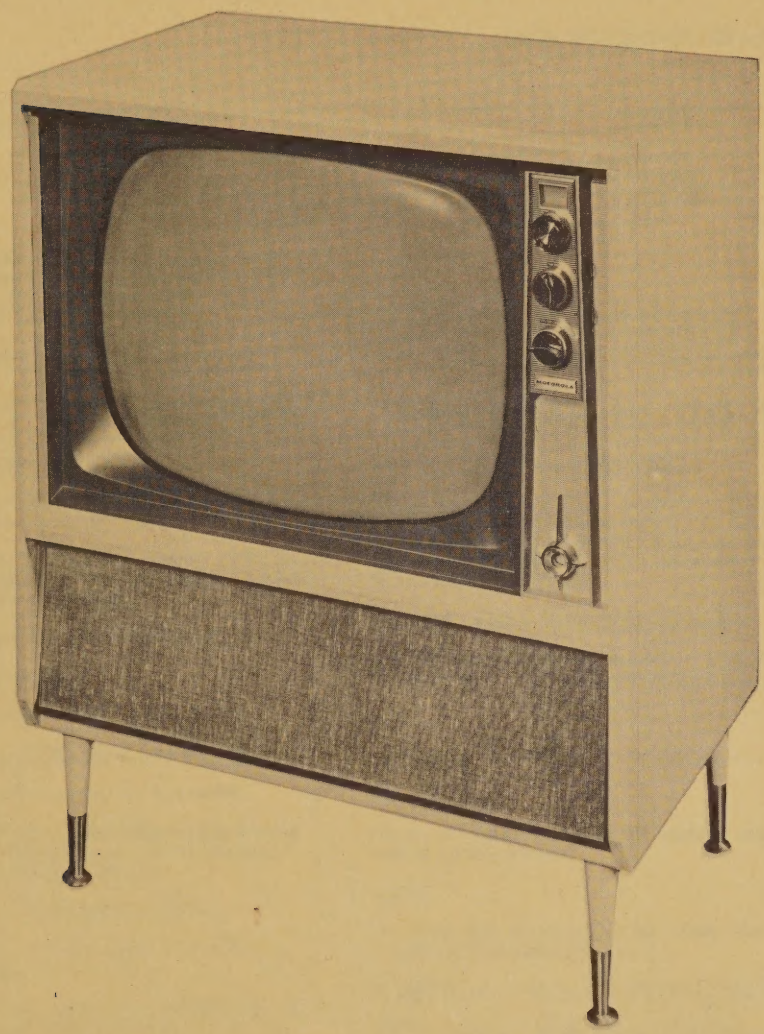
IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)

MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)



MODEL A21K106B (Ch. WTS-553)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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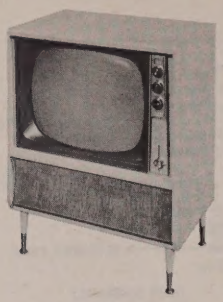
MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.



MODEL A21K106B (Ch. WTS-553)

TRADE NAME	Motorola	MODELS	CHASSIS
		21K107B, M	TS-553
		Y21K107B, M	TS-553Y
		A21K106B, M, A21T60BG, CH, MG	WTS-553
		A21K106B, M, A21T60BG, CH, MG ..... Remote Control	TR-3
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois		
TYPE SET	Television Receiver with Remote Control		
TUBES	TV: VHF-Seventeen, UHF-Eighteen Remote Control-Seven		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING	Normal: 210 Watts, 1.9 Amp. @ 117 Volts AC Tuning: 226 Watts, 2.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL A21K106B, M

1. Remove 3 push-on type knobs from the front. Remove the "INSTA-MATIC" pushbutton by clockwise rotation.
2. Remove 8 wood screws holding rear cover. Partially remove rear cover and remove plug and leads to switches on rear cover. Remove rear cover.
3. Remove plugs from chassis to tuner and speaker.
4. Remove 4 bottom chassis bolts.
5. Remove chassis with picture tube.

REMOTE CONTROL AND TUNER BRACKET REMOVAL

1. Remove plug from Remote Control unit to bracket.
2. Remove 2 bottom and 2 top chassis bolts holding Remote Control unit. Partially remove unit and remove microphone plug. Remove Remote Control unit.
3. Remove plug from "INSTA-MATIC" pushbutton.
4. Locate actuating lever on inside front control bracket and push lever upward.
5. Remove 1 top and 2 bottom metal screws holding control bracket. Remove 1 wood screw holding bracket at rear.
6. Move bottom of bracket to the rear to clear vertical and brightness knobs, then move to the right to clear front retainer flange. Remove control bracket and tuner.

REMOTE TRANSMITTER DISASSEMBLY

Hold unit upside down with pushbuttons down, parallel with the floor. Apply pressure with a twisting motion against bottom edge of main case. Apply pressure in the opposite direction at the same time against grille end of case. This will disengage retainer tongue from the groove of the two sections. Remove grille end and slide chassis out.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Remove the "INSTA-MATIC" pushbutton by clockwise rotation and then the two screws holding switch in place. Move switch plate to most convenient place, set Fine Tuning to mid-range. The adjustments are accessible one at a time as the channels are selected.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 5 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube.

WIDTH

The width may be varied by the Width control. (For location, see tube placement chart.)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency slug. (For location, see tube placement chart.)

FUSE

One fuse is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished by 2 magnetic rings located behind the yoke, on the neck of the picture tube.

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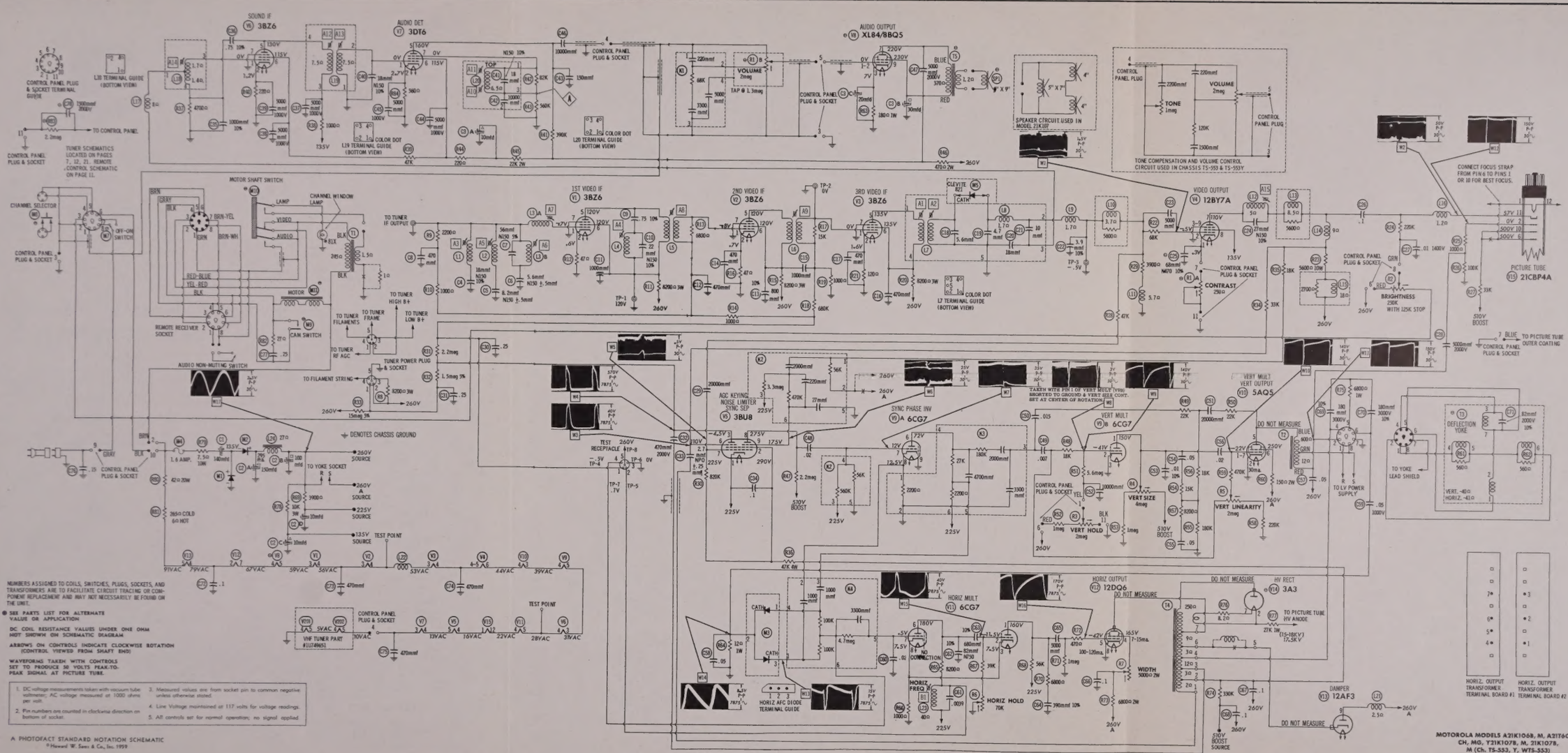
J144

SET 444 FOLDER 1


SOUND IF V6 3BZ6
AUDIO DET V7 3DT6
AUDIO OUTPUT V8 XL84/8BQ5
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V2 3BZ6
3RD VIDEO IF V3 3BZ6
VIDEO OUTPUT V4 12BY7A
AGC KEYING, NOISE LIMITER SYNC SEP. V5 3BU8
SYNC PHASE INV V9A 6CG7
VERT MULT V9B 6CG7
VERT MULT OUTPUT V10 5AQ5
HORIZ MULT V11 6CG7
HORIZ OUTPUT V12 12DQ6
HV RECT V14 3A3
DAMPER V13 12AF3
PICTURE TUBE V15 21CBP4A
CONTROL PANEL PLUG & SOCKET TERMINAL GUIDE
L30 TERMINAL GUIDE (BOTTOM VIEW)
TO CONTROL PANEL
TUNER SCHEMATICS LOCATED ON PAGES 7, 12, 21. REMOTE CONTROL SCHEMATIC ON PAGE 11.
CONTROL PANEL PLUG & SOCKET
CONTROL PANEL PLUG & SOCKET
L19 TERMINAL GUIDE (BOTTOM VIEW)
COLOR DOT L20 TERMINAL GUIDE (BOTTOM VIEW)
TAP @ 1.3meg
VOLUME 2meg
SPEAKER CIRCUIT USED IN MODEL 21K107
TONE COMPENSATION AND VOLUME CONTROL CIRCUIT USED IN CHASSIS TS-553 & TS-553Y
TONE 1meg
CONTRAST 25kΩ
BRIGHTNESS 250K WITH 125K STOP
CONNECT FOCUS STRAP FROM PIN 6 TO PINS 1 OR 10 FOR BEST FOCUS.
TO PICTURE TUBE OUTER COATING
MOTOR SHAFT SWITCH
CHANNEL SELECTOR
OFF-ON SWITCH
CHANNEL WINDOW LAMP
REMOTE RECEIVER SOCKET
MOTOR
CAM SWITCH
AUDIO MON-MUTING SWITCH
TO TUNER IF OUTPUT
TO TUNER FILAMENTS
TO TUNER FRAME
TO TUNER LOW B+
TO TUNER HIGH B+
TO TUNER RF AGC
TUNER POWER PLUG & SOCKET
TO FILAMENT STRING
DENOTES CHASSIS GROUND
TEST RECEPTACLE 419-8
TEST POINT
TO YOKE SOCKET
260V SOURCE
260V A SOURCE
225V SOURCE
135V SOURCE
TEST POINT
VHF TUNER PART #1U749651
HORIZ AFC DIODE TERMINAL GUIDE
HORIZ FREQ
HORIZ HOLD 70K
VERT HOLD 2meg
VERT SIZE 4meg
VERT LINEARITY 2meg
WIDTH 5000Ω 2W
510V BOOST
510V BOOST SOURCE
DEFLECTION YOKE
TO YOKE LEAD SHIELD
TO LV POWER SUPPLY
DO NOT MEASURE
TO PICTURE TUBE HV ANODE
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD #1
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD #2
MOTOROLA MODELS A21K1068, M, A21T6080, CH, MG, Y21K1078, M, 21K1078, M (Ch. TS-553, Y, WTS-553)
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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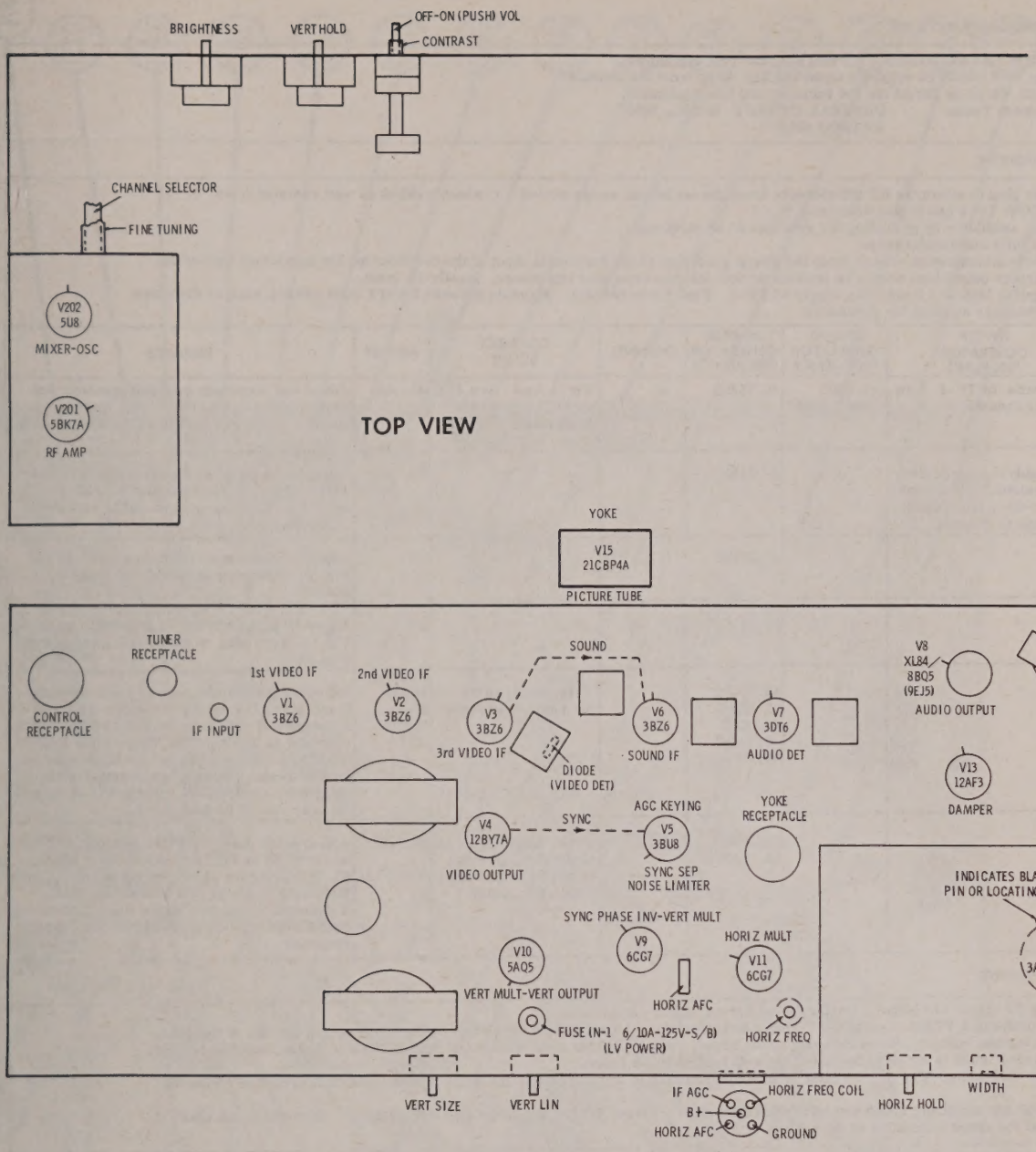
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

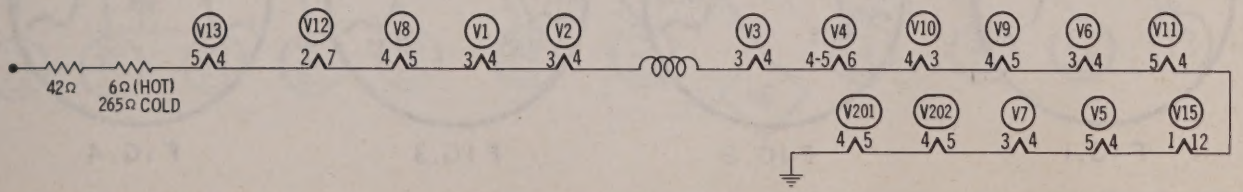
POWER SUPPLY FAILURE
No raster, no sound Fuse (1 6/10A), Rectifiers (B+)

SWEEP FAILURE
No raster, has sound Rect. (Horiz. AFC), V11, V12, V13, V14, V15, Rect. (B+)
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, Rectifiers (B+)
Vert. off freq. V9, V10
Horiz. off freq. V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.)
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V15
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V5, V9
No horiz. sync V5, V9, Rectifier (Horiz. AFC)
No vert. or horiz. sync V5, V9

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #9050L, 9150
WALSCO #2521

VIDEO IF ALIGNMENT

Remove the yoke plug to eliminate RF interference from the horizontal sweep circuit. Connect a 1500Ω 50 watt resistor from TP-8 to TP-6 (CAUTION: TP-8 has B plus voltage on it.)
Disable the tuner oscillator by grounding the grid (pin 9) of oscillator.
Set the Contrast fully counterclockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the negative lead of a 6 volt bias supply to TP-4. Positive to chassis. Maintain between 2 and 5 volts peak to peak on the scope except where otherwise noted in the procedure.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to TP-2. Low side to chassis.	44.0MC (10MC Swp)	45.75MC	13	Vert. Amp. thru 47K to TP-3. Low side to chassis. (Across Video Det. load)	A1, A2	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Peak with maximum core separation.
2.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). low side to chassis.	"	47.25MC	"	"	A3, A4	Increase scope gain. Remove bias if necessary. Adjust to place marker in trap notch. as in Fig. 2. Tune slug at end of coil away from chassis.
3.	"	"	"	41.25MC	"	"	A5	Adjust to place marker in trap notch as in Fig. 2. Tune slug at end of coil nearest chassis.
4.	"	"	"	39.75 MC	"	"	A6	Adjust to place marker in trap notch as in Fig. 2. Tune slug at end of coil away from chassis.
5.	"	"	"	39.75MC 41.25MC 44.0MC 45.75MC 47.25MC	"	Vert. Amp. to TP-1. Low side to chassis.	Mixer Plate Coil & A7	Set scope for 3 volts peak to peak. Restore 6 volt bias. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. The Mixer Plate Coil affects the center peak and A7 affects the two outside peaks. Tune slugs at end of coils away from chassis. If a suckout (trap effect) occurs, detune A8 to remove.
6.	"	"	"	42.25MC 45.75MC	"	Vert. Amp. thru 47K to TP-3. Low side to chassis. (Across Video Det. load)	A8, A9	Adjust A8 to place 42.25MC marker at 50% on curve as in Fig. 4. Adjust A9 to place 45.75MC marker at 50% on other side. Tune slug to end of coil nearest chassis. If necessary, retouch Mixer Plate Coil to correct tilt. Retouch A8 and A9 for correct response.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust all controls for normal picture and sound.
Connect the DC probe of a VTVM to point (A). Common to chassis. Adjust A10 for maximum deflection choosing the one of two peaks that produce the highest voltage. While listening to the sound, retouch A10 for maximum sound with MINIMUM distortion. The top slug (A11) is a preset slug which is set near the top of the coil form and left there.
Change to a very weak signal (this may be done by loosely coupling the antenna lead to the antenna terminals) that produces a hiss the sound.
Adjust A12 and A13 for maximum sound and MINIMUM distortion. Adjust A14 for maximum undistorted sound. If sound is not clear at this point, repeat the above procedure as necessary.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and turn the Contrast fully clockwise.
Adjust the Fine Tuning until a strong 4.5MC beat pattern is visible.
Adjust A15 to find the two points at which the beat pattern is just noticeable on the screen. Tune the slug to the center of these two points. (Use the MINIMUM amount of inductance that will result in no apparent beat pattern).

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 8 & 21.
REMOTE CONTROL ALIGNMENT INSTRUCTIONS ON PAGE 18.

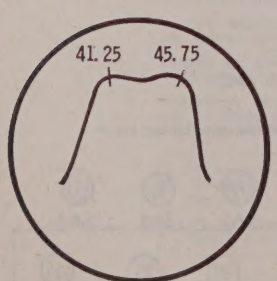


FIG.1

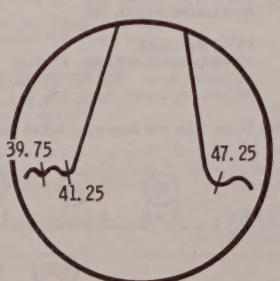


FIG.2

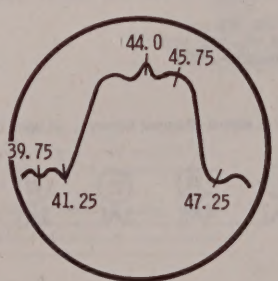


FIG.3

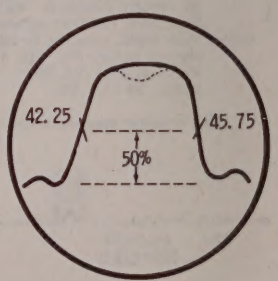
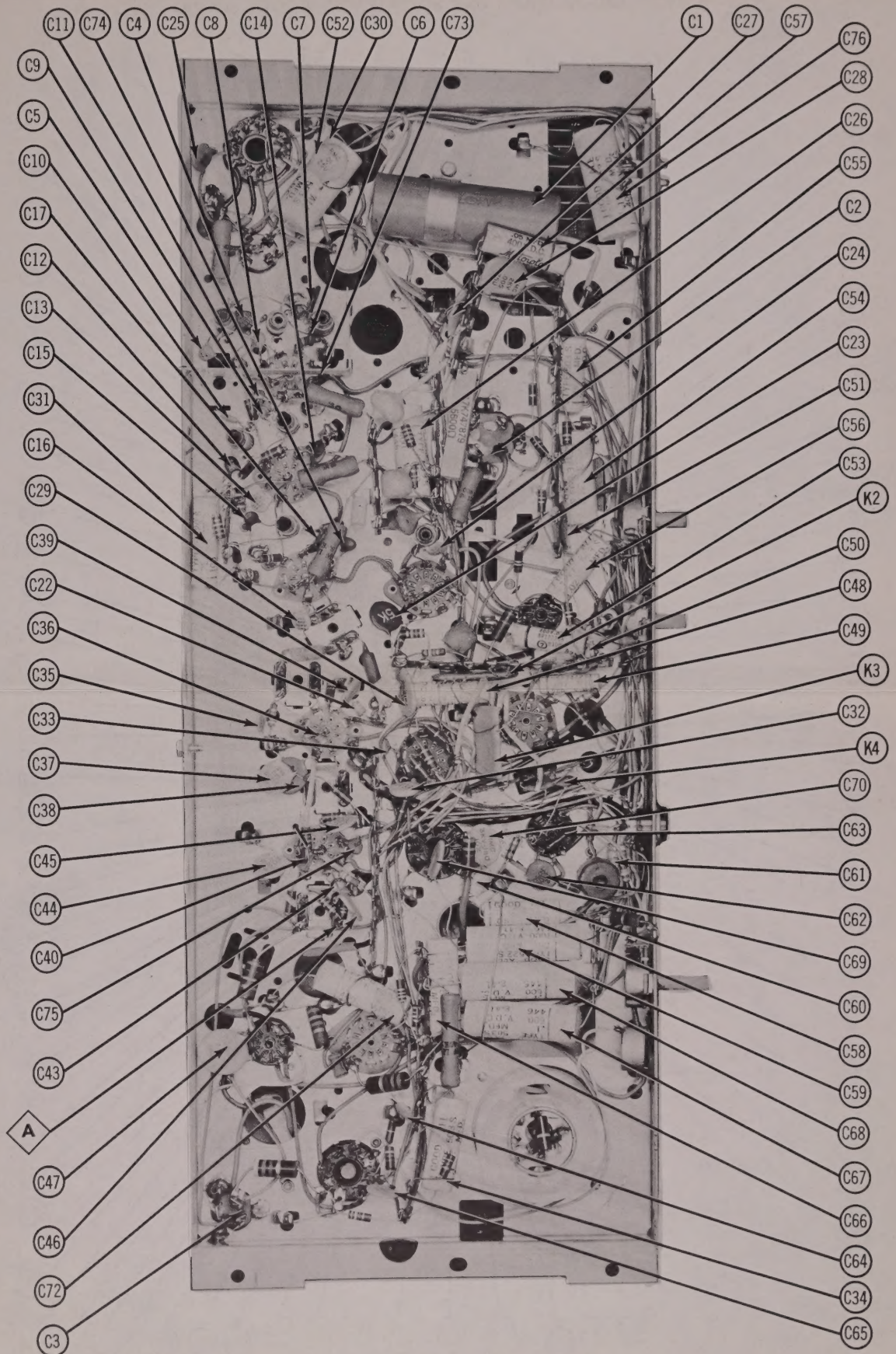
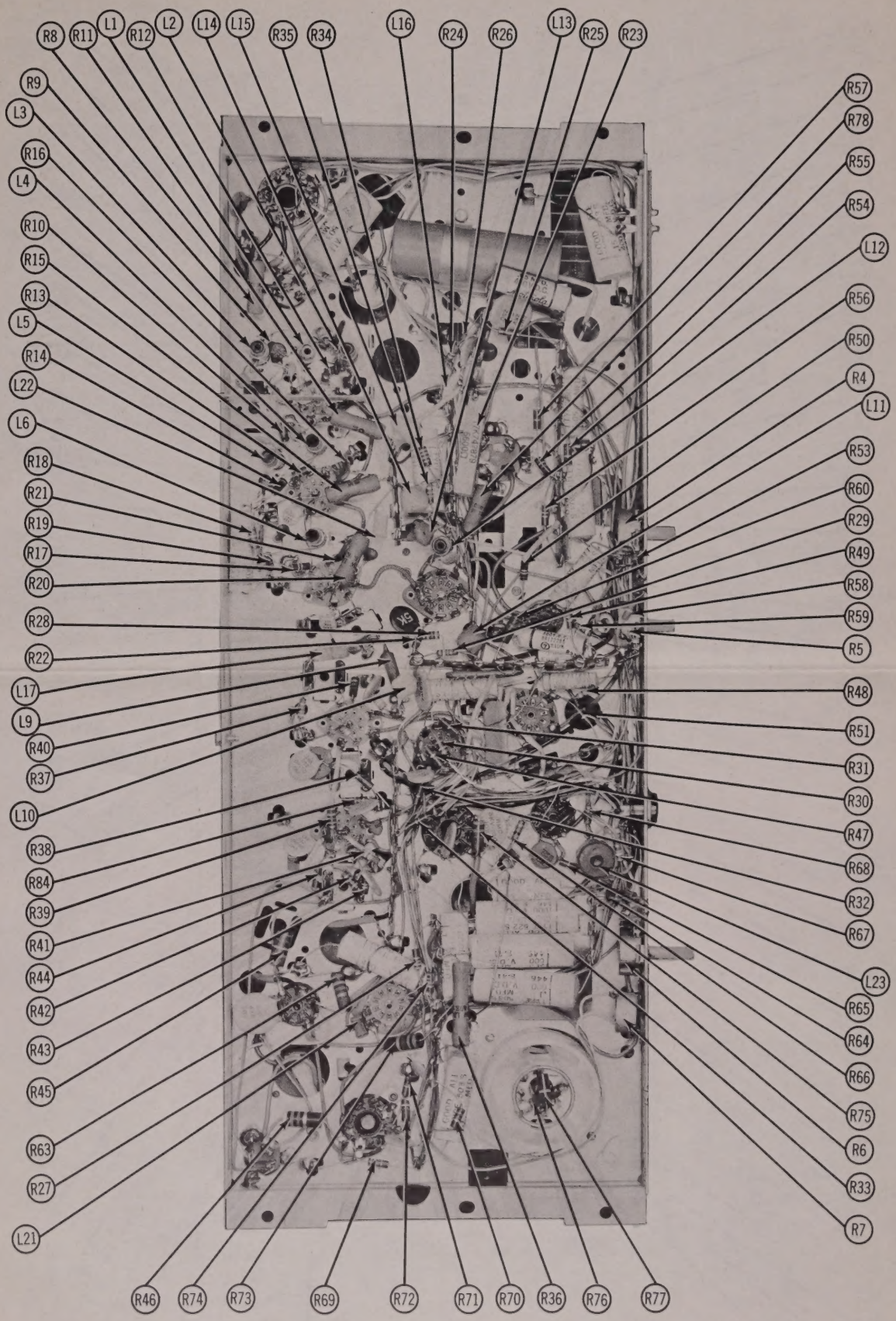


FIG.4



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

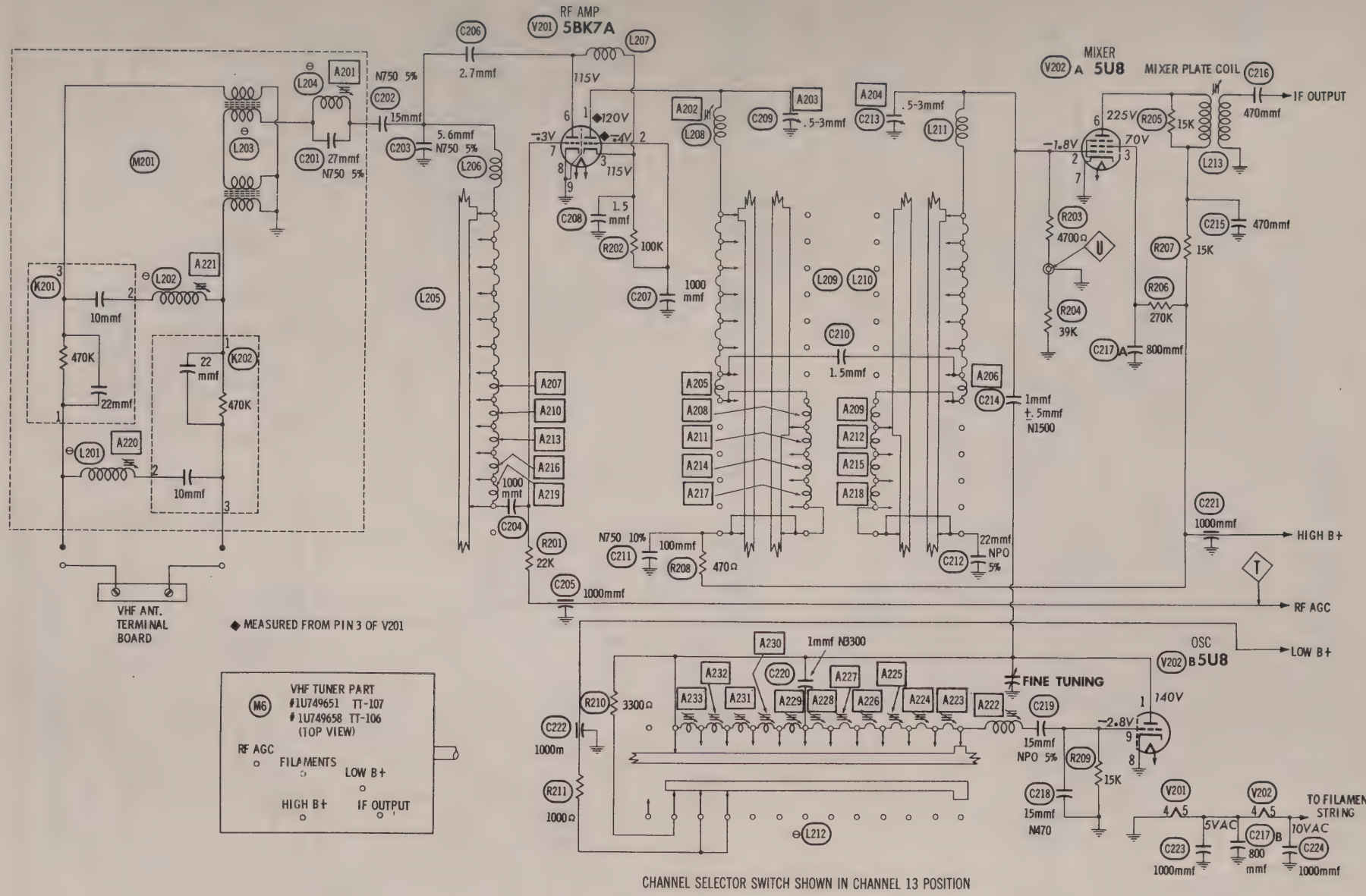
MOTOROLA MODELS A21K106B, M, A2116OBG, CH, MG,
Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

MOTOROLA MODELS A21K106B, M, A2116OBG, CH, MG,
Y21K107B, M, 21K107B, M (Ch. T5-553, Y, WT5-553)

FOLDER 1



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER 1U749651 (TT-107), 1U749658 (TT-106)

MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lad should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A201, A207, A232, A233, A234 ..... General Cement #8282, 8606, 8606L, 9295
Walsco #2543, 2544, 2545
A202 ..... General Cement #9050L, 9150
Walsco #2521, 2527
Remove yoke plug to prevent interference radiation. Connect an 1800Ω 50watt resistor from B+ to chassis.

VHF RF AND MIXER ALIGNMENT

Connect a clip lead from point (T) to chassis.
Remove the tuner shield.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	94MC	94MC	6	Vert. Amp. thru 47K to point (U). Low side to chassis.	A201	Adjust for MINIMUM response at 94MC marker .
2.	"	"	213MC	211.25MC 215.75MC	13	"	A202	Preset A203 and A204 to mid-range. Adjust A202 for maximum gain and symmetry similar to Fig. 201.
3.	"	"	183MC	181.25MC 185.75MC	7	"	A203, A204	Adjust for maximum gain and symmetry of response similar to Fig. 201 with marker as shown .
4.	"	"	85MC	83.25MC 87.75MC	6	"	A205, A206, A207	Adjust in numerical order for response similar to Fig. 202. First two adjustments are for proper placing of markers. Third adjustment is for maximum gain and symmetry.
5.	"	"	"	"	"	"	A201	Readjust SLIGHTLY above point where it begins to effect response curve at sound marker.
6.	"	"	79MC	77.25MC 81.75MC	5	"	A208, A209, A210	Adjust in numerical order for response similar to Fig. 202. First two adjustments are for proper placing of markers. Third adjustment is for maximum gain and symmetry.
7.	"	"	69MC	67.25MC 71.75MC	4	"	A211, A212, A213	"
8.	"	"	63MC	61.25MC 65.75MC	3	"	A214, A215, A216	"
9.	"	"	57MC	55.25MC 59.75MC	2	"	A217, A218, A219	"
10.	"	"	44MC	42.5MC 44.5MC	"	"	A220, A221	Adjust A220 for MINIMUM response at 42.5MC marker and A221 for MINIMUM at 44.5MC. Retouch either or both for flat response with MINIMUM amplitude at markers. (CAUTION! Cover of filter must be in place when observing response on scope.)

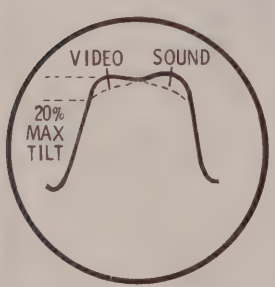


FIG. 201

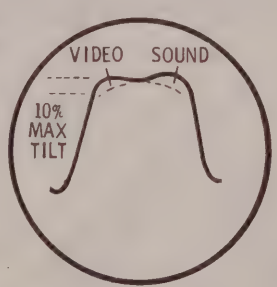


FIG. 202

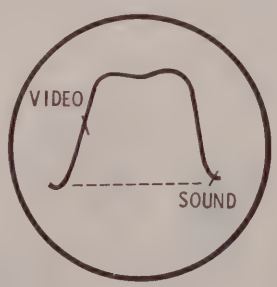


FIG. 203

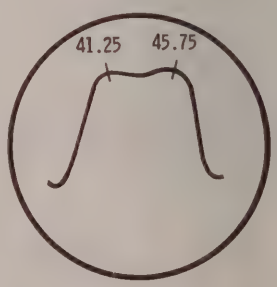
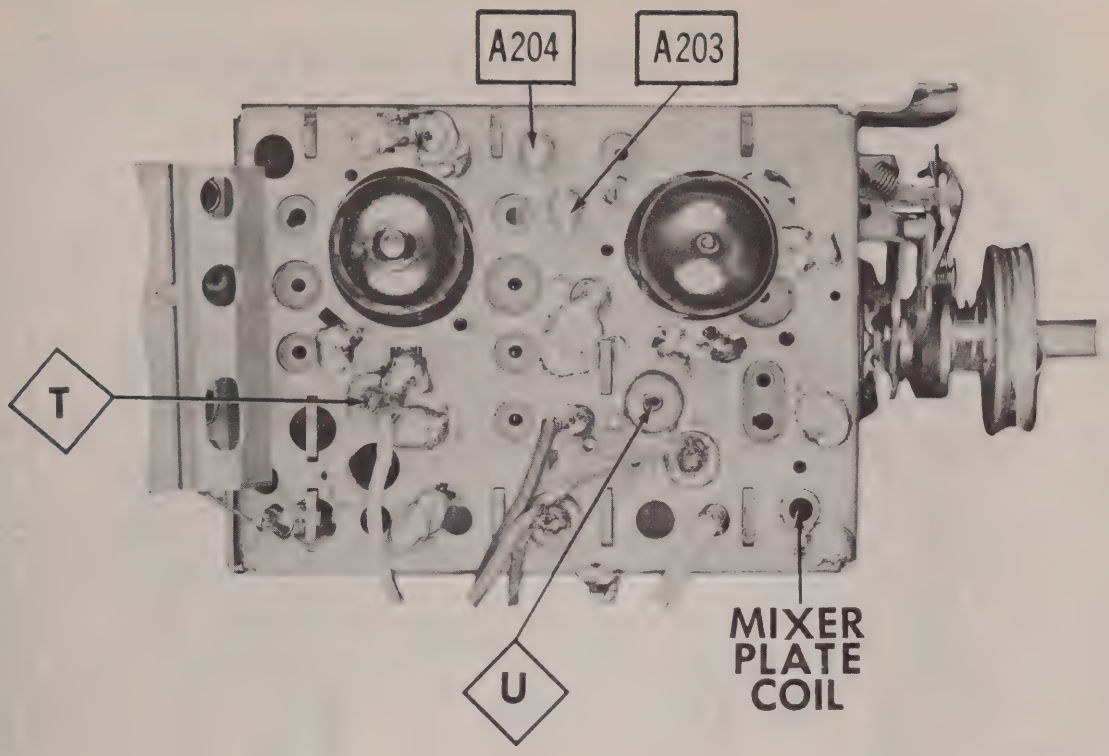
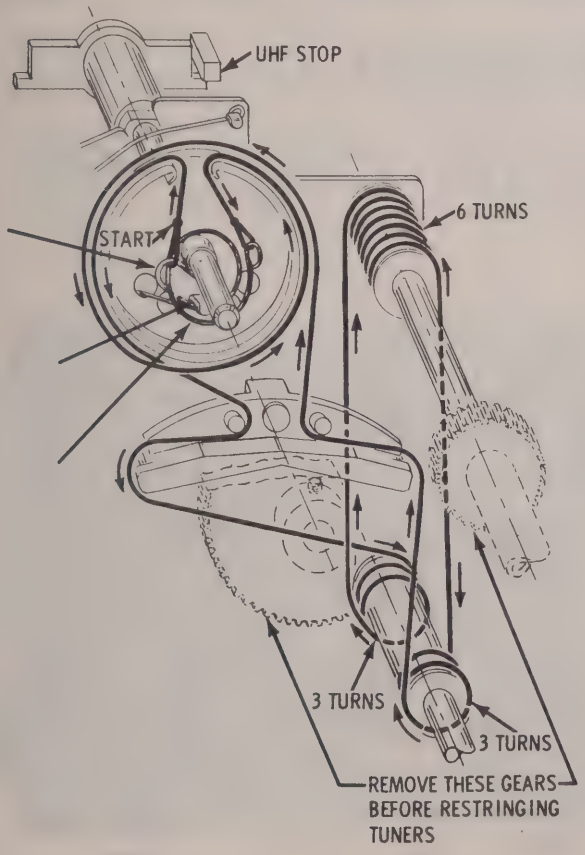


FIG. 204

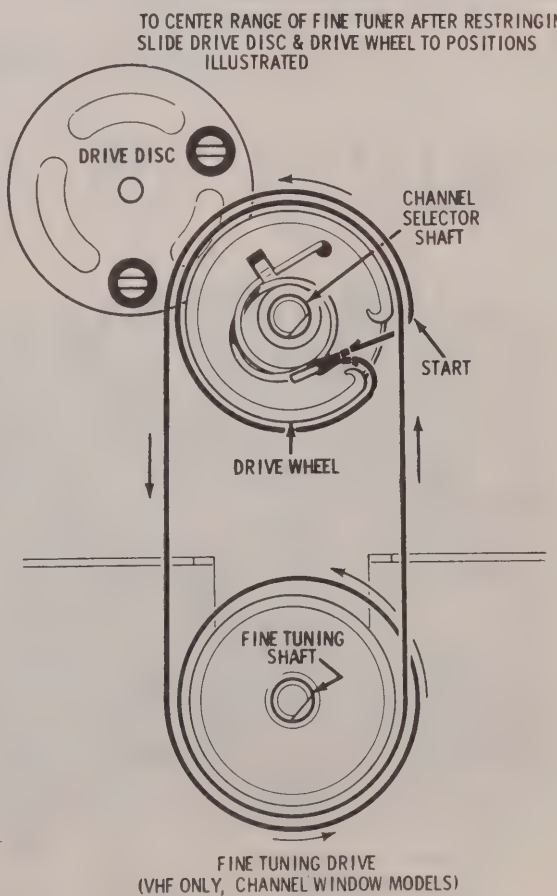
continued PAGE 21



TUNER 1U749651 - TOP VIEW



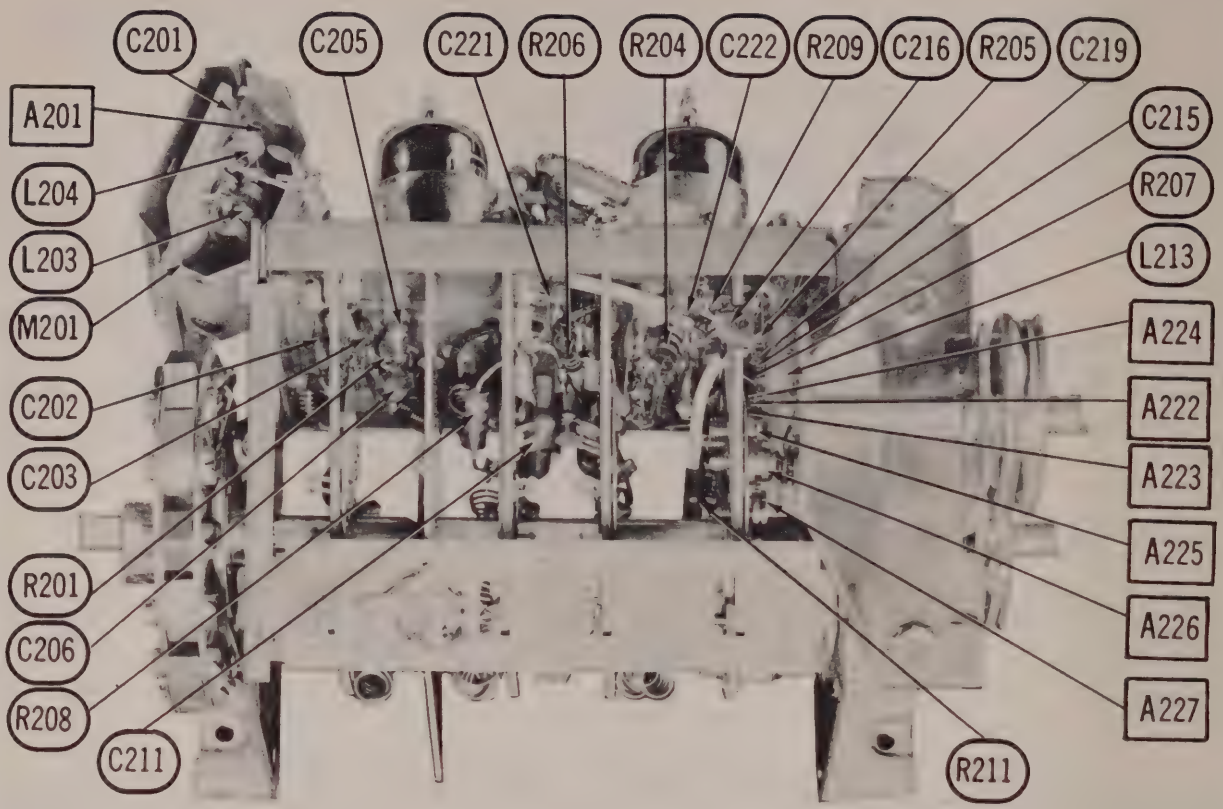
SEPARATE FINE TUNING MODELS (VHF/UHF)



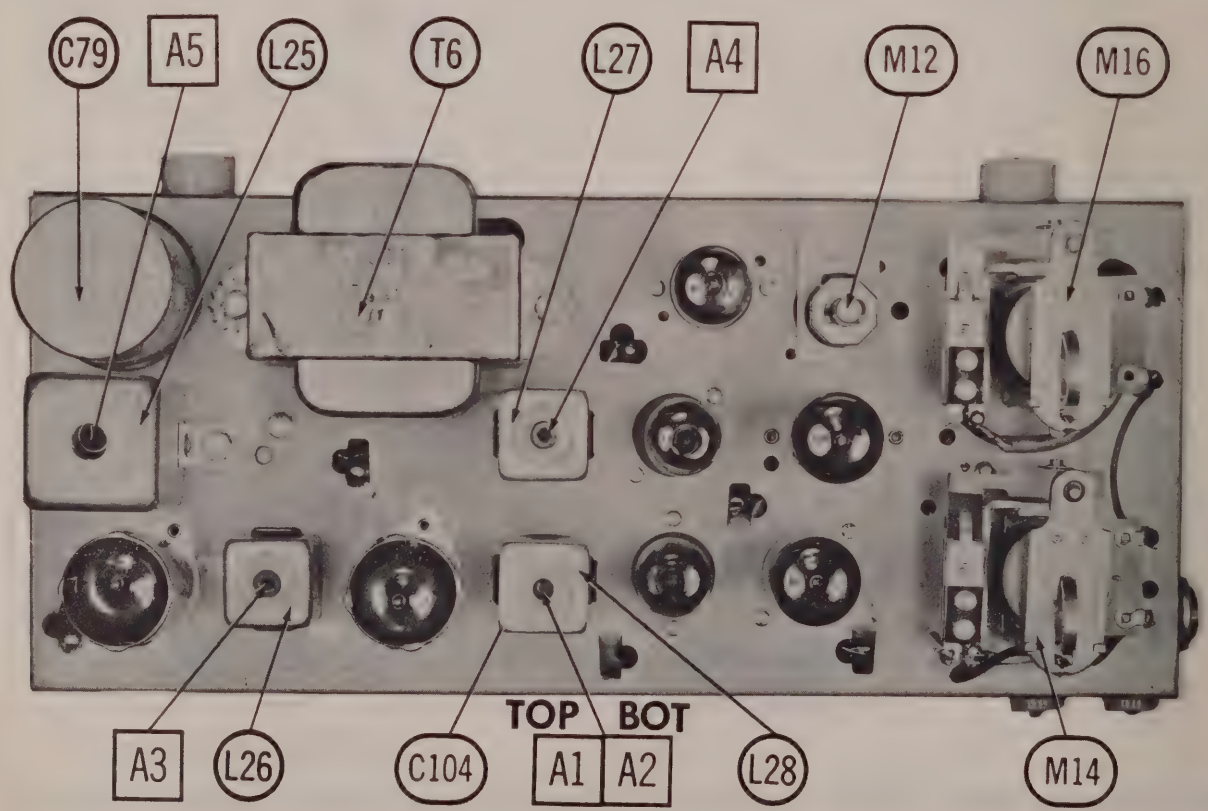
SEPARATE FINE TUNING MODELS (VHF ONLY)

DRIVE CORD STRINGING

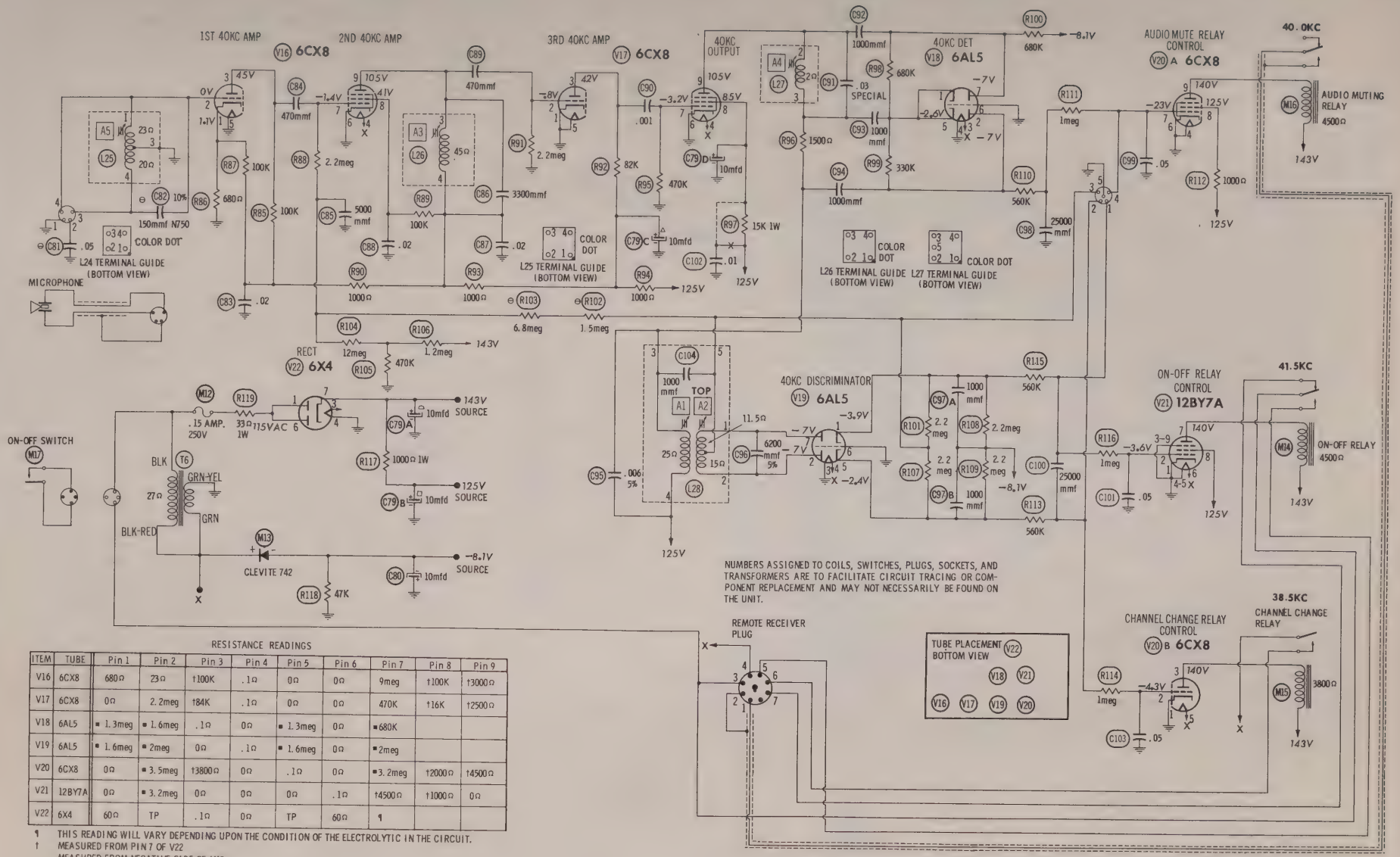
SET 444 FOLDER 1



TUNER 1U749651 - LEFT SIDE



REMOTE CONTROL TR-3 - TOP VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V16	6CX8	680Ω	23Ω	†100K	.1Ω	0Ω	0Ω	9meg	†100K	†3000Ω
V17	6CX8	0Ω	2.2meg	†84K	.1Ω	0Ω	0Ω	470K	†16K	†2500Ω
V18	6AL5	▪ 1.3meg	▪ 1.6meg	.1Ω	0Ω	▪ 1.3meg	0Ω	▪680K		
V19	6AL5	▪ 1.6meg	▪ 2meg	0Ω	.1Ω	▪ 1.6meg	0Ω	▪2meg		
V20	6CX8	0Ω	▪ 3.5meg	†3800Ω	0Ω	.1Ω	0Ω	▪3.2meg	†2000Ω	†4500Ω
V21	12BY7A	0Ω	▪ 3.2meg	0Ω	0Ω	0Ω	.1Ω	†4500Ω	†1000Ω	0Ω
V22	6X4	60Ω	TP	.1Ω	0Ω	TP	60Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V22
▪ MEASURED FROM NEGATIVE SIDE OF M13
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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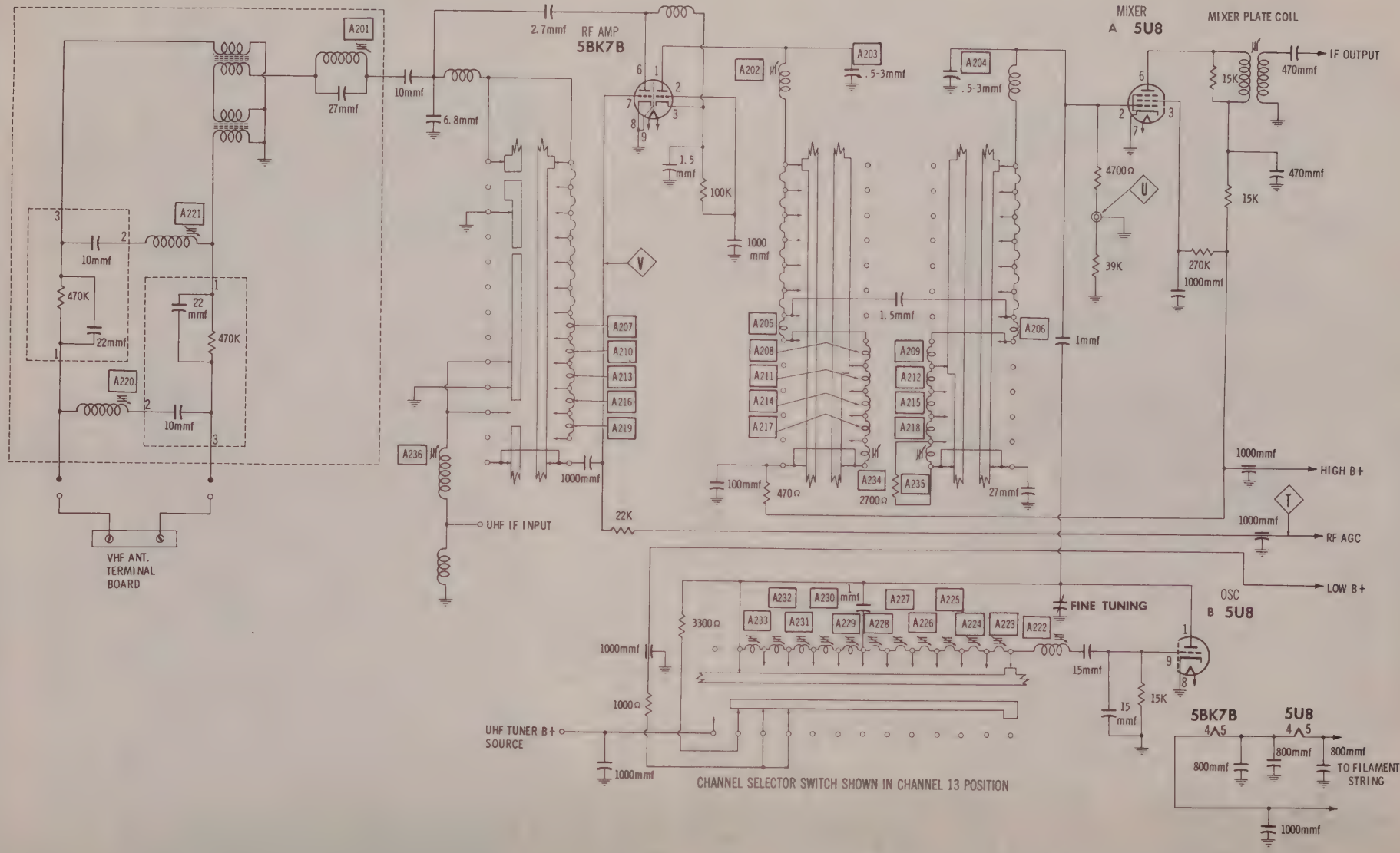
REMOTE CONTROL TR-3

MOTOROLA MODELS A21K106B, M, A2116OBG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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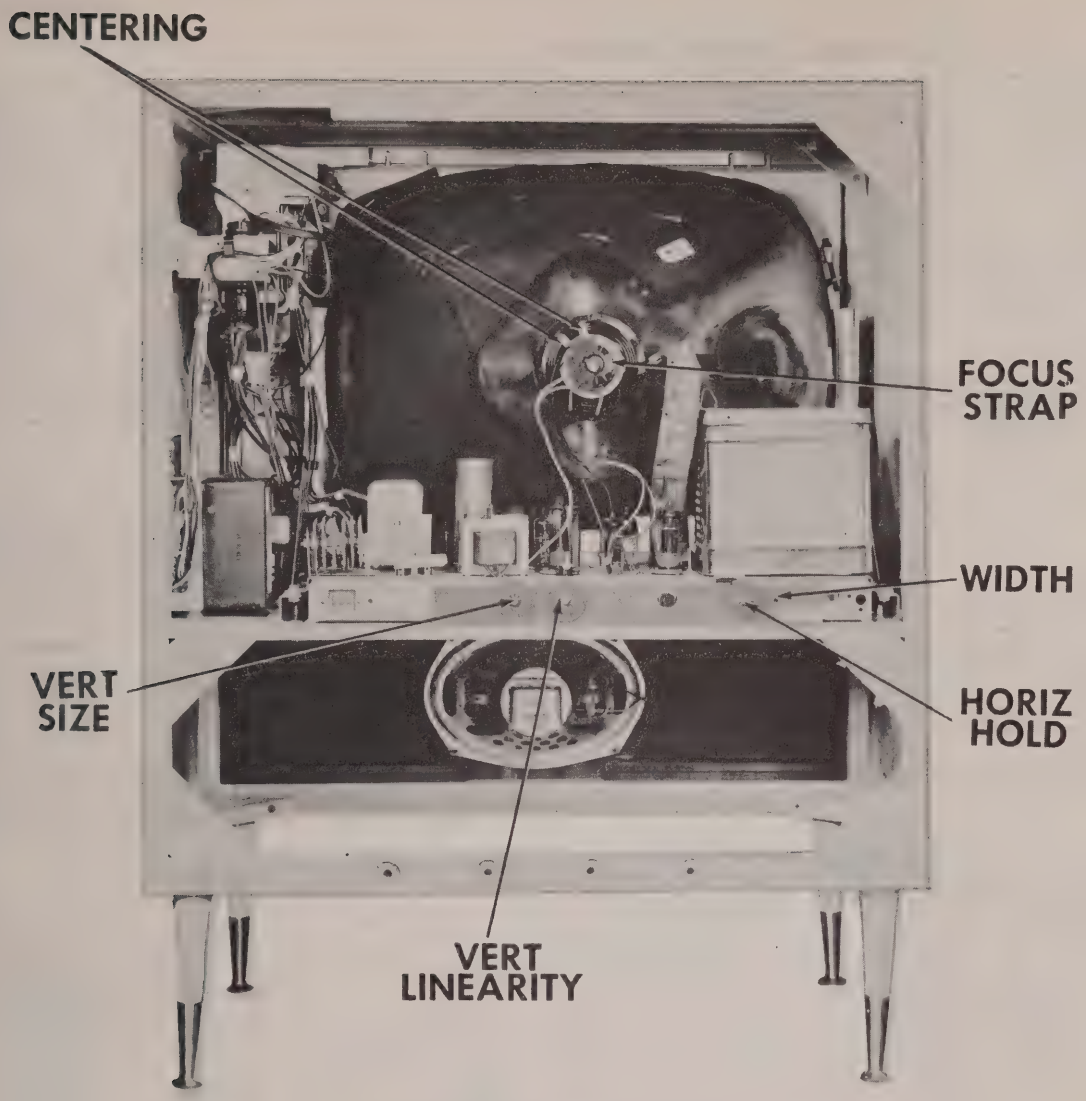
VHF TUNER with UHF provisions 1U749659 (TT-106Y)



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Adjust the Brightness and Contrast controls for a normal picture.

Short out the AFC voltage by connecting a clip lead from TP-7 to chassis.

Connect a .1mfd. 400 volt capacitor from TP-5 to chassis.

Adjust Horizontal Hold to the point where the picture is almost stable horizontally.

Remove the capacitor from TP-5 and adjust the Horizontal Frequency slug (B1) to the point where the picture is almost stable horizontally.

Remove the clip lead from TP-7 and chassis. Adjust the Horizontal Hold control until the picture is synchronized horizontally.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	3BZ6	
V2	2nd Video IF Amp.	3BZ6	
V3	3rd Video IF Amp	3BZ6	
V4	Video Output	12BY7A	
V5	AGC Keying-Noise Limiter-Sync Sep	3BU8	
V6	Sound IF	3BZ6	
V7	Audio Det	3DT6	
V8	Audio Output	XL84/6BQ5	9EJ5*

ITEM No	USE	TYPE	NOTES
V9	Sync Phase Inv. - Vert. Mult.	6CG7	
V10	Vert. Mult.-Vert. Output	5AQ5	
V11	Horiz Mult	6CG7	
V12	Horiz Output	12DQ6	
V13	Damper	12AF3	
V14	HV Rect.	3A3	3A3/ 144A01*

* Alternate.

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	MOTOROLA PART No	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V15	21CBP4A	21BTP4 ①	21CBP4-A ②	21CBP4/ 21CBP4A ③	① "Aluminized". Add Ion Trap. ② "Silverama." ③ "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SPRAGUE PART No.		
C1	140	150	23KT37620	PRS150V150	BRS805	TC495	TD-150-150	TVA-1422		
C2A	≥150	300	23KT38749	AFH34-02-75	D0025	FP419.55		TVL5-4587.1	*	
B	≥100	300								
C	≥10	300								
D	10	300								
C3A	≥10	300	23KT38750	AFH3-106	C0810	FP388.1	TMT-93	TVL-3635.5		
B	≥20	300								
C	20	25								

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	18		N150 10%	21R120578						
C5	8.2		N150 ±.5mmf	21R128940						
C6	5.6		N150 ±.5mmf	21R129124						
C7	56		N150 5%	21R128699						
C8	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C9	.75		10%	21K735623						
C10	22		N150 10%	21R120539						
C11	1000			21K73436	EF-001	MFT-1000			503C-DI	
C12	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C13	600		10%	21K74732					5GA-T48 10%	*
C14	470			21C746781	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C15	1000			21R115396	BPD-001	DD-102	BYA10D1	B-310	5HK-D1	
C16	470			21C746781	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C17	470			21C746781	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C18	5.6			21R129124					5TCCB-V568	*
C19	4.7			21R119954	NPO-DI 4.7	TCZ-4R7	C10Y47C	CNO-547	5TCCB-V47	
C20	18			21R120578	DI 18	TCZ-18	L10QL18	CNO-418	5GA-Q18	
C21	10			21R12114	BPD-00001	TCZ-10	L10QL	CNO-410	5GA-Q1	
C22	3.9		10%	21R115953						
C23	5600			21R115312	BPD-006	DD-502	BYA10D5	B-350	5HK-D5	
C24	27		N150 10%	21R119896						
C25	68		N470 10%	21R11593						①
C26	.1	400		21R12006	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C27	.01	1400		21R124832			HVE16S1	28V-110	MB-S1	
C28	5000	2000		21R120983			HVC20D5	28V-247	20HKB-D5	
C29	3000			21K741863	BPD-03	DD-303	BYB562	B-120	5HK-S2	
C30	.35	100		9K123045	P388N-35		CUB2P25	GEM-2025	2TM-P25	
C31	.25	100		9K124570	P388N-25		CUB2P25	GEM-2025	2TM-P25	
C32	470	2000		21R121478	HVD-30-470	DD30-471	HVB20T47	28V-347	20HKD-T5	
C33	3.7		NPO ±.25mmf	21R125599					5TCCB-V278 ±.25mmf	*
C34	.1	400		5R121006	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C35	1000		10%	21A21678				JL-210	5GA-DS10%	*
C36	.75		10%	21K735623						
C37	5000	1000		21K738298		DD-502	BYA10D5	B-350	5HK-D5	
C38	5000	1000		21K738298		DD-502	BYA10D5	B-350	5HK-D5	
C39	5000	1000		21K738298		DD-502	BYA10D5	B-350	5HK-D5	
C40	16		N150 10%	21R120578						
C41	18		N150 10%	21R120578						
C42	10000			21K738700	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C43	150			21K745777	BPD-00015	DD-151	L10T15	B-315	5GA-T15	
C44	5000	1000		21K738298		DD-502	BYA10D5	B-350	5HK-D5	
C45	5000	1000		21K738298		DD-502	BYA10D5	B-350	5HK-D5	
C46	10000			21K483728	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C47	5000	2000		21R120983		DD30-502	HVC20D5	28V-247	20HKB-D5	
C48	.02	600		5R123079	P488N-03	DD-303	CUB6S2	GEM-612	6TM-S2	
C49	.007	200		5K74131	P388N-007	DD-683	CUB6D8	GEM-627	6TM-D68	
C50	.015	200		5K735621	P388N-015		CUB6S15	GEM-4115	4TM-S15	
C51	20000			21R741862	BPD-02	DD-203	BYB562	B-120	5HK-S2	
C52	10000			21K483728	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C53	.01	600	10%	5R122385			PM6S1	GTM-611	6TM-S1	
C54	.05	600		5R122386	P6 88N-05	DD-503	CUB6S5	GEM-615	6TM-S5	
C55	.03	300		5R121005	P388N-05	DD-503	CUB2S5	GEM-415	2TM-S5	
C56	.02	600		5R123079	P488N-03	DD-203	CUB6S2	GEM-612	6TM-S2	
C57	.05	600		5R121567	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C58	.05	300		5R121005	P388N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C59	.05	1000		5R121870	P108N-05		CUB10S5	GEM-4015	10TM-S5	
C60	.02	300		5R121003	P388N-02	DD-303	CUB2S2	GEM-212	2TM-S2	
C61	.0036	400		5R125942			PM6D4	GTM-624	6TM-D4	
C62	82		N750 10%	21R126696		TCN-82	C10Q82U	CNT-482	5TCU-Q82S 10%	*

CAPACITORS (cont)

ITEM No	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C63	680		10%	21K736046	1469-00068	D6-681	1R5T68	JL-368	MB-368	
C64	390		10%	21K743364	DI 390	D6-391	1R5T39	JL-339	MB-339	
C65	5000			21R115312	BPD-006	DD-502	BYA10D5	B-350	5HK-D5	
C66	.1	400		5R12006	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C67	.1	600		5R121869	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C68	.1	600		5R121869	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C69	180	3000	10%	21R129134					30GA-T18S 10%	*
C70	180	3000	10%	21R129134					30GA-T18S 10%	*
C71	82	2000	10%	21R130150			HVD20Q82	2DY-482	30GA-Q82S 10%	*
C72	.1	400		5R12006	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C73	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C74	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C75	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C76	.15	400		5R12174	P488N-15		CUB4P15	GEM-4015	4TM-P15	
C77	.25	600			P688N-.25		CUB6P25	GEM-6025	6TM-P25	
C78	1500	2000			HVD-30-1500	DD30-152	HVB30D15	2HV-215		②

① Some versions may use a 47mmf in this application (Part #21R11593).
② Not used in some versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No	IRC PART No.	MALLORY PART No	
R1A	250Ω	½	18K746804					Contrast, ①
B	2meg	½						Volume, Tap ② 1.3meg, ①
R2A	250 K	½	18K746870		B47-250K-8 *	BU-130 *	TA254L *	Brightness, Stop ② 125K
B	Shaft				Not Req.	TM-3	Not Req.	
R3A	2meg	½	18K746948		B47-2meg-8	BU-139	TA26L	Vert. Hold
B	Shaft				Not Req.	TM-3	Not Req.	
R4A	4meg	½	18K743524	AB-86	A47-4meg-8	QU-141	PTA56L	Vert. Size
B	Shaft			AK-18	RN-3	TQ	Not Req.	
R5A	2meg	½	18K743523	AB-75	B47-2meg-8	QU-139	PTA26L	Vert. Lin.
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R6A	70K	½	18K746235	AB-35	A47-75K-8	QU-125	PTA35L	Horiz. Hold
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R7A	5000Ω	2(WW)	17B746869		A43-5000		FL-5K	Width
B	Shaft				RN-3		Not Req.	

* Use 125K resistor in series with left hand terminal.
① Chassis 72-553, Y use 250Ω Contrast and 2meg Volume with switch (Part #18K748008).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R8	6200Ω	3	17K735283	
R9	2200Ω		[redacted]	
R10	1000Ω		6K127960	
R11	8200Ω	3	17K735283	
R12	47Ω		6K127542	
R13	6800Ω		6K119930	
R14	1000Ω		6K127960	
R15	8200Ω	3	17K735283	
R16	47Ω		6K127543	
R17	15K		6K119934	
R18	680K		6K128239	
R19	1000Ω		6K127960	
R20	8200Ω	3	17K735283	
R21	120Ω		6K128236	
R22	68K		6K124507	
R23	3600Ω	10	17K747879	
R24	220K		6K123522	
R25	1000Ω		6R6054	
R26	100K		6K123313	
R27	33K		6K121704	
R28	47K		6K121399	
R29	3900Ω		6K121931	
R30	820K		6K128230	
R31	2.2meg		6K127001	
R32	1.5meg 5%		6K127000	
R33	15meg 5%		6K125891	
R34	33K		6K127632	
R35	18K		6K122748	
R36	47K	4	17K747815 7	
R37	4700Ω		6K121847	
R38	1000Ω		6K127960	
R39	47K		6K121399	
R40	220Ω		6K127099	
R41	390K		6R5646	
R42	82K		6K125179	
R43	560K		[redacted]	
R44	220Ω		6K125471	
R45	22K	2	6R6049	
R46	4700	2	6K125146	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R47	2.2meg		6K127001	
R48	18K		6K122849	
R49	22K		6K119935	
R50	22K		6K119935	
R51	5.6meg		6K124781	
R52	1meg		6K124494	
R53	1meg		6K123234	
R54	15K		6K119934	
R55	180K		6K125531	
R56	18K		6K123848	
R57	8200Ω		6K119931	
R58	220K		6R6015	
R59	470K		6K119406	
R60	150Ω	2	6K119403	
R61	560Ω		6K122802	
R62	560Ω		6K122802	
R63	180Ω	1	6R6390	
R64	12Ω	1	6K127508	
R65	8200Ω		6K119931	
R66	1000Ω		6K119932	
R67	39K		6K121931	
R68	56K		6K128228	
R69	3900Ω		6K121931	
R70	6800Ω		6K119930	
R71	1meg		6K124494	
R72	470Ω		6K127633	
R73	6800Ω	2	6K122012	
R74	330K		6K128227	
R75	8800Ω	1	6R124699	
R76	8.2Ω		6K128098	
R77	27K	1	6K121901	
R78	10K	3	17K744464	
R79	7.5Ω	10	17K744240	
R80	42Ω	20	17K741080	
R81	255Ω Cold 60 Hot		6K745413	
R82	27Ω			
R83	3.2meg		6R3927	Note 1
R84	560Ω		6R400058	

Note 1. Not used in some versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No	REPLACEMENT DATA
K1	Tone Compensation	220mmf, 3300mmf, 5000mmf, 68K	51B747486	Sprague TC8-15
K2	Sync Input	2"mmf, 220mmf, 2000mmf, 56K, 56K, 470K, 560K, 3.3meg	51B747883	
K3	Sync Output	2000mmf, 3300mmf, 4700mmf, 2200Ω, 2200Ω, 27K, 180K	51B743739	
K4	Horiz. AFC	1000mmf, 1000mmf, 3300mmf, 100K, 100K, 4.7meg	51B747581	

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	47.25MC Trap	24C747584	20-1049	TV-153 ▲			
L2	39.75MC Trap	24K747583	20-1044 *	TV-152			
L3A	1st Video IF	24K747586					
B	41.25MC Trap						
L4	47.25MC Trap	24K747585	20-1049	TV-153 ▲			
L5	2nd Video IF	24K747587	17-4522	TV-130	6319	VF-3	
L6	3rd Video IF	24K747587	17-4523	TV-130	6319	VF-3	
L7	4th Video IF	24K747589					
L8	Resonant Choke	24K733225					10 Microhenries
L9	Resonant Choke	24K733225					10 Microhenries
L10	Series Peaking Coil	24K744411	19-3100 ■	TV-181 ■	6113 ■	VP-3 ■	100 Microhenries, wound on 5600Ω resistor
L11	Shunt Peaking Coil	24D736006	19-3180	TV-184	6180	VP-5	180 Microhenries
L12	4.5MC Trap	24K739290	20-1004	TV-161	1469 ▲	SF-3	
L13	Series Peaking Coil	24K746871	19-3300 ■	TV-200 ■	6133 ■	VP-7 ■	330 Microhenries, wound on 5600Ω resistor
L14	Shunt Peaking Coil	24K744410	19-4400	TV-202	6136		400 Microhenries
L15	Shunt Peaking Coil	24K743340					1600 Microhenries, wound on 2700Ω resistor
L16	Resonant Choke	24R119889					8.5 Microhenries
L17	Resonant Choke	24K743737					7.5 Microhenries ①
L18	1st Sound IF	24B743463					Tapped ③ 1.4Ω
L19	2nd Sound IF	24B738943	17-3496 ■	TV-113 ■	6303 ■	SF-2 ■	
L20	Quadrature Coil	24K746031					
L21	RF Choke	24B74771			4611		7.5 Microhenries
L22	Fil. Choke	24K743675	19-1001	BC-562	4604		1.5 Microhenries

▲ Disregard tap.
• Use original capacitor.
■ Parallel with 5600Ω resistor.
▲ Disconnect C40 (18mmf).
① IRC Part #CLA.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No	
L23	40Ω		24K743426	19-1576 *	TV-165 ▲	6210 *	H-102 *	HS-5 *	Horiz freq

* Drill mounting hole larger. ▲ Disregard tap.

FILTER CHOKE

ITEM No.	RATINGS		REPLACEMENT DATA						
	CURRENT (Measured)	INDUCTANCE @ CURRENT 1000 ⟨⟩	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No	Triad PART No.
L24	.300A	27Ω	1 Hy.	25K746803	26C92	C-2996	F-801	C-2238	26C92	C-23X

TRANSFORMER (FILAMENT)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI	SEC 1	SEC 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No	Triad PART No.
T1	117V ⅄ .060A	6.3V ⅄ .73A		25K749733	21F08	P-2946			21F08	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No	Triad PART No.
T2	Vert. Output	25K744974	26877 ①	A-2853 ②	V316 ③	VO36 ①	A-8148 ②	26877 ①	A-102X
T3	Yoke-Horiz. (34MH) (90°)-Vert. (38MH)	24K747492	Y-15 ③ ④ ⑤	MDF-97 ① ② ③	MD-8 ③			Y-15 ③ ④ ⑤	Y-45-2
	Alt. Yoke	24K744322							
	Rear Cover & Centering Device	59C72145							YC-1
	Yoke Retainer	42A735257 ⟩							CL-1
	Retainer Clamp	42A73617S ⟩							
T4	Horiz. Output	24K748397 7							
	Primary Coil	[redacted]			MOC-2				
	Secondary Coil	24K745106				MT-3			

① Connect as autoformer.
② Cut and remove green lead.
③ Use original rear cover and centering device.
④ Use original leads and plug. Connect same as original.
⑤ Use original Horizontal Yoke Damping capacitor, if necessary.
⑥ Remove jumper from yoke terminals #5 and #4.
7 Complete transformer assembly.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No	Triad PART No.	
T5	6200Ω	6-8Ω	25K749865	26846	A-2900	AU-804	A-3856	26846	S-51X	① Alternate Part No.
	5000Ω	3-4Ω	25K743211 1	26849	A-3019	AU-800	A-3337	26849	S-5Z	

SPEAKER

ITEM No.	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP		MOTOROLA PART No.	QUAM PART No.	
SP1	6" x 9"	PM	8Ω		50K749194 ①	69AZ	① Used in Models A21K106B, M
	4"	PM	8Ω		50K749193 ②		② Used in Models A21T60BG, CH, MG
	5" x 7"	PM	8Ω		50D750725 ③		③ Used in Models 21K107B, M, Y21K107B, M
	4"	PM	16Ω		50K749190 ④		④ Two used in Models 21K107B, M, Y21K107B, M

MOTOROLA MODELS A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)

FOLDER 1

PARTS LIST & DESCRIPTION (continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				
	CURRENT (Measured)	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.295A	48K122479 ①	1241AH ① HA504 ②	T350 ① TV500 ②	40K ②	① Selenium Type. ② Silicon Type.
M2	.295A	48K122479 ①	1241AH ① HA504 ②	T350 ① TV500 ②	40K ②	
M3		48B742698 ①	K1616C	2V1	12	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	LC	1.6A	65K744238	9K744239	33301.6	346016	N 1 6/10	HN 1 3/10 to 1 3/4

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MOTOROLA PART No.	CBS PART No.	SYLVANIA PART No.	
M5	Clevite 821	48K747548	1N60	1N295	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M6	Tuner	1U749651	VHF (TT-107) Ch. WTS-553
	Tuner	1U749658	VHF (TT-106) Ch. TS-553
	Tuner	1U749659	VHF with UHF provisions (TT-106Y) Ch. TS-553Y
	Tuner		UHF (VTT-89) Ch. TS-553Y
M7	Switch	40B745748	On-Off, Not used in Ch. TS-553, Y
M8	Switch	40B744130	Channel Selector, Not used in Ch. TS-553, Y
M9	Switch	40B745255	Cam, Not used in Ch. TS-553, Y
M10	Switch	40K749724	Motor Shaft, Not used in Ch. TS-553, Y
M11	Motor	59K749723	Includes M10, Not used in Ch. TS-553, Y

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	61C747252	
Mask	13K748039	Models A21K106B, M, Y21K107B, M, 21K107B, M
Mask	13K748034	Models A21T60BG, CH, MG
Pushbutton	38C747348	Channel Selector, Models A21K106B, M, A21T60BG, CH, MG
Knob	1V748504	Channel Selector, Models 21K107B, M
Knob	1V748512	Fine Tuning, Models 21K106B, M, A21T60BG, CH, MG, 21K107B, M
Knob	1V748517	Fine Tuning, Models Y21K107B, M
Knob	1V748505	Off-On-Volume
Knob	36B743431	Brightness, Vert. Hold
Knob	36C748137	Contrast
Knob	36K746089	Horiz. Hold
Knob	36B748094	Tone
Cabinet	16K747721	Models 21K107B, Y21K107B
Cabinet	16K747662	Model A21K106B
Cabinet	16K747660	Model A21K106M
Cabinet	16K748357	Model A21T60BG
Cabinet	16K748358	Model A21T60 CH
Cabinet	16K748355	Model A21T60MG
Cabinet	16E747220	Model 21K107M, Y21K107M
Leg	16K747668	Model A21K106B
Leg	16K747666	Model A21K106M

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

REMOTE CONTROL
PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V16	1st 40KC Amp. -		
	2nd 40KC Amp.	6CX8	
V17	3rd 40KC Amp. -40KC Output	6CX8	
V18	40KC Det.	6AL5	
V19	40KC Discriminator	6AL5	
V20	Audio Mute Relay Cont.		
	Channel Change Relay Cont.	6CX8	
V21	Off-On Relay Cont.	12BY7A	
V22	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C79A	▲10	450	23B745624 ①	AFH4-10	D0090	FP434	TMQ-10	TVL-4760	
B	▲10	450							
C	▲10	450							
D	10	450							
C80	10	50	23K90205	PRS50V10	BBR10-50	TC32	TD-10-50	TVA-1304	

① Some versions may use 10-10-10-2mfd ⓐ 200VDC in this application (Part #23K748467).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C81	.05	400		8R121002	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	①
C82	150		N750 10%		N750-DI 150	DTN-150	C10T15U	CN7-315	5TCU-T15S 10% *	②
C83	.02	200		8R121003	P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C84	470			21K125529	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C85	5000			21R122915	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C86	3300			21K746523	BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	
C87	.02	200		8R121003	P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C88	.02	200		8R121003	P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C89	470			21K125529	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C90	.001	600		8R122103	P688N-001	DD-102	CUB6D1	GEM-621	6TM-D1	
C91	.03	200		8K129139						
C92	1000			21R115386	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C93	1000			21R115386	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C94	1000			21R115386	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C95	.006	200	5%	8K125945						
C96	6200		5%	21K749662			1DR5D62		MS-262	
C97A	1000			21R400937	BPD-2X001	DD3-103	BYC6DD1	〈B-210〉	5HK-2D1	
B	1000							B-210		
C98	25000			21K740806	BPD-02	DD-203	BYB6S2	B-120	10HKB-S22	
C99	.05	200		8R121005	P288N-05	DF-503	ST2S5	GEM-415	2TM-S5	
C100	25000			21K740806	BPD-02	DD-203	BYB6S2	B-120	10HKB-S22	
C101	.05	200		8R121005	P288N-05	DF-503	ST2S5	GEM-415	2TM-S5	
C102	.01	200		8R121868	P288N-01	DD-103	CUB2S1	GEM-411	2TM-S1	
C103	.05	200		8R121005	P288N-05	DF-503	ST2S5	GEM-415	2TM-S5	
C104	1000			21A121678	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	

① Some versions may use .01mfd ⓐ 400V in this application (Part #8R121002).

② Not used in chassis equipped with orange coded microphone (Part #50K750573).

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R85	100K		6K125534	
R86	680Ω		6R6040	
R87	100K		6K125534	
R88	2.2meg		6R3927	
R89	100K		6K125534	
R90	1000Ω		6K127960	
R91	2.2meg		6R3927	
R92	82K		6K125179	
R93	1000Ω		6K127960	
R94	1000Ω		6K127960	
R95	470K		6K119406	
R96	1500Ω		6R127513	
R97	15K	1	6K122762	
R98	680K		6K128229	
R99	330K		6K126227	
R100	680K		6K129178	
R101	2.2meg		6K127001	
R102	1.5meg 5%			Note 1
R103	6.8meg			Note 1
R104	12meg		6R400334	
R105	470K		6K121279	
R106	1.2meg		6K125530	
R107	2.2meg		6K127001	
R108	2.2meg		6K127001	
R109	2.2meg		6K127001	
R110	560K		6K127631	
R111	1meg		6K122324	
R112	1000Ω		6K127960	
R113	560K		6K127631	
R114	1meg		6K122324	
R115	560K		6K127631	
R116	1meg		6K122324	
R117	1000Ω	1	6R6327	
R118	47K		6K121299	
R119	33Ω	1	6K129180	

Note 1. Some versions may use a single 8.2meg to replace R102 and R103.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L25	40KC Input Coil	24K748745					
L26	40KC Amp. Plate Coil	24B745791					Tapped ⓐ 20Ω
L27	40KC Output Plate Coil	24K748744					
L28	Discriminator	24K748687					Sec. Tapped ⓐ 15Ω

REMOTE CONTROL
PARTS LIST AND DESCRIPTIONS (Cont)

TRANSFORMER (FILAMENT)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T6	117V @ .275A	6.3V @ 3.9A		25D748820						

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M12	LC	.15A 250V S/B	65K749181	9K743152	313.150 (LC-.15A-S/B)	346008	N 15/100	HN 0-3/10

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MOTOROLA PART No.	CBS PART No.	SYLVANIA PART No.	
M13	Clevite 742	48K636691	1N60		Neg. Supply (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M14	Relay	80B746677	On-Off, 41.5KC (Lock Type)
M15	Relay	80A743105	Channel Change, 38.5KC (Momentary Contact)
M16	Relay	80B746677	Audio, 40.0KC (Lock Type)
M17	Switch		On-Off

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Pushbutton	38C748372	Channel Selector Model TR-3T Transmitter
Pushbutton	38K748370	Off-On Model TR-3T Transmitter
Pushbutton	38K748371	Mute Model TR-3T Transmitter

ALIGNMENT INSTRUCTIONS

REMOTE CONTROL RECEIVER ALIGNMENT TR-3

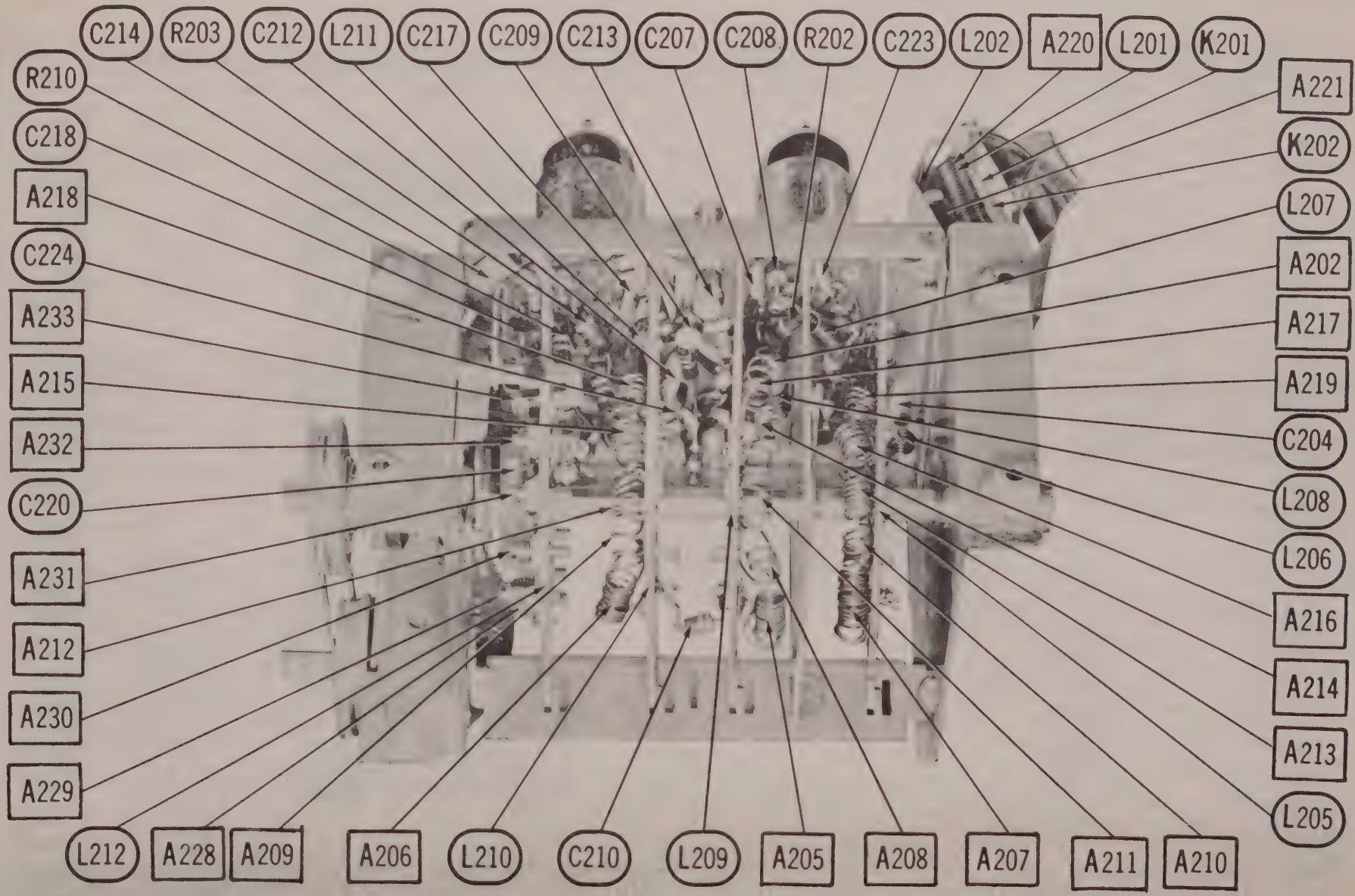
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

Unplug the microphone.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to microphone input. Low side to chassis.	40KC (300 micro-volts output)		DC probe thru 470K to pin 1 of the Service Test Receptacle. Common to pin 2 of the Test Receptacle.	A1 (Top slug)	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Use zero point with slug farthest from cabinet.
2.	"	"	"		DC probe thru 470K to pin 3 of Test Receptacle. Common to chassis.	A2 (bottom slug)	Adjust for maximum negative voltage. Set generator output to provide -15 to -25 volts on VTVM. Use maximum nearest chassis.
3.	"	"	"		"	A3	Adjust for maximum negative voltage. Set generator output to provide -15 to -25 volts on VTVM. Use peak farthest from chassis.
4.	"	"	"		"		Adjust generator output for -20 volts on VTVM.
5.	"	"	"		DC probe thru 470K to pin 4 of Test Receptacle. Common to chassis.	A4	Adjust for MINIMUM negative voltage. Resonate core away from chassis. Repeat step 1.

NOTE: A5 has not been adjusted at this time. Due to the additional equipment requirements it is normally adjusted only at the factory. Therefore, adjustments of A5 should only be made if the coil was replaced or tampered with. Remove the signal generator and plug the microphone back into its socket. Connect either a high impedance AC meter (capable of reading .1 volt) or an oscilloscope thru a .5mfd capacitor to pin 7 (grid) of the 6CX8 (2nd Amp.). Common or low side to chassis. Place the transmitter approximately 3 inches away from the microphone, press the Channel Selector button of the transmitter and rotate the unit for maximum meter or scope indication. Without moving the transmitter continue pressing the Channel Selector button and adjust A5 for maximum indication. Remove the AC meter or scope and remove the transmitter.

REMOTE CONTROL TR-3 - BOTTOM VIEW



TUNER 1U749651 - RIGHT SIDE

TUNER ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

The tuner shield must be in place when adjusting the oscillator.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A222	Adjust to place sound marker in trap notch as in Fig. 203. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A223	
			201MC	199.25MC 203.75MC	11		A224	
			195MC	193.25MC 197.75MC	10		A225	
			189MC	187.25MC 191.75MC	9		A226	
			183MC	181.25MC 185.75MC	8		A227	
			177MC	175.25MC 179.75MC	7		A228	
			85MC	83.25MC 87.75MC	6		A229	
			79MC	77.25MC 81.75MC	5		A230	
			69MC	67.25MC 71.75MC	4		A231	
			63MC	61.25MC 65.75MC	3		A232	
			57MC	55.25MC 59.75MC	2		A233	

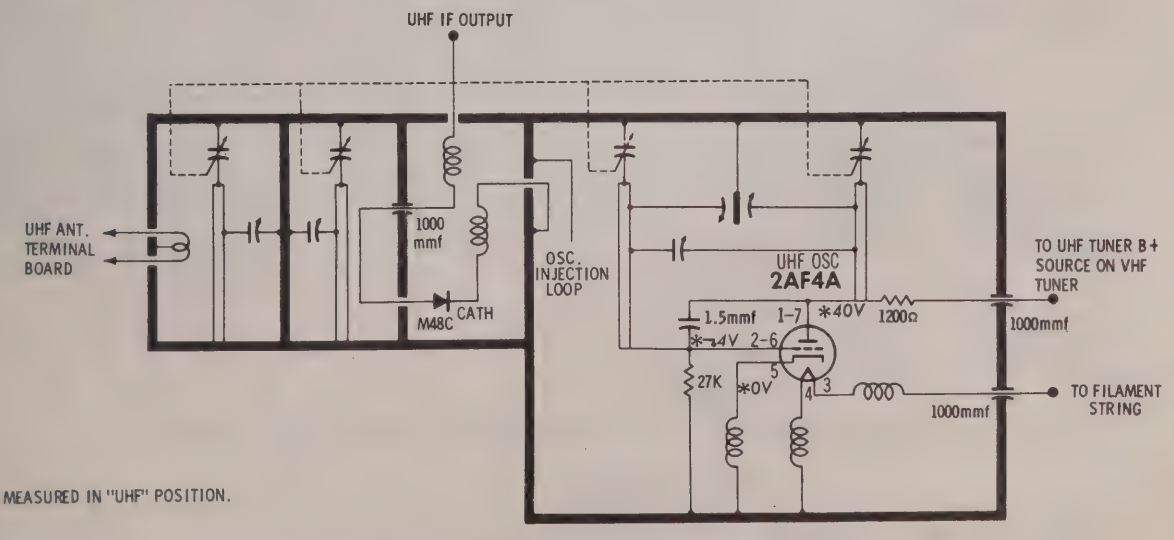
UHF IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	50Ω Carbon Resistor	High side to point (V). Low side to chassis.	44MC	41.25MC 45.75MC	UHF	Vert. Amp. thru 47K to point (U). Low side to chassis.	A234, A235	Adjust for maximum gain and symmetry of response similar to Fig. 204 with markers as shown.
13.	Disconnect sweep generator and short antenna terminals.				"	USE VTVM. Across Video Detector load.	A236	Adjust for maximum DC noise voltage.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



* MEASURED IN "UHF" POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF TUNER VTT-89

TUNER PARTS LIST AND DESCRIPTIONS

1U749651, 1U749658

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	5BK7A	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5U8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	27		N750 5%	21R122050		TCZ-27	C10Q27U	CN7-427	5TCU-Q27S 5% *	
C202	15		N750 5%	21R124919	N750-DI 15	DTZ-15	C10Q15U	CN7-415	5TCU-Q15S 5% *	
C203	5.6		N750 5%	21R121154						
C204	1000			21R115386	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C205	1000			21K739920	EF-001	MFT-1000			503C-D1	
C206	2.7			21R115950					5TCCB-V27S 5% *	
C207	1000			21R115386	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C208	1.5			21R115959		TCZ-1R5	C10V15C	CNO-515	5TCCB-V15S *	
C209	.5-3			21K735985		829-3				
C210	1.5			21R115959		TCZ-1R5	C10V15C	CNO-515	5TCCB-V15S *	
C211	100		N750 10%	21R120577	N750-SI 100	TCZ-100	C10T1U	CN7-310	5TCU-T1S 10% *	
C212	22		NPO 5%	21R124554	NPO-DI 22	DTZ-22	C10Q22C	CNO-422	5TCC-Q22S 5% *	
C213	.5-3			21K735985		829-3				
C214	1.0		N1500±.5mmf	21R114071						
C215	470			21R114554	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C216	470			21R114534	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C217 A	800			21K747024	BPD-2X001	DD2-102	BYD6DD1	B-210	5HK-2D1	
B	800							B-210		
C218	15		N470	21R125066						
C219	15		NPO 5%	21R128077	NPO-DI 15	DTZ-15	C10Q15C	CNO-415	5TCC-Q15S 5% *	
C220	1.0		N3300	21R124552						
C221	1000			21K739920	EF-001	MFT-1000			503C-D1	
C222	1000			21K739920	EF-001	MFT-1000			503C-D1	
C223	1000			21R115386	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C224	1000			21R115386	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R201	22K		6K119405	
R202	100K		6K122313	
R203	4700Ω		6K121847	
R204	39K		6K125535	
R205	15K		6K119934	
R206	270K		6R6414	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R207	15K		6K119934	
R208	470Ω		6K127633	
R209	15K		6K119934	
R210	3300Ω		6K121725	
R211	1000Ω		6K121301	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA	
K201	40MC Filter	10mmf, 22mmf, 470K	51C747535	Sprague	FS-6
K202	40MC Filter	10mmf, 22mmf, 470K	51C747535	Sprague	FS-6

COILS (RF-IF)

ITEM No.	USE	MOTOROLA PART No.	NOTES
L201	IF Trap Coil	24B747530 †	
L202	IF Trap Coil	24B747530 †	
L203	Ant. Trans.	24B747543 †	
L204	FM Trap Coil	24B747801 †	
L205	Ant. Coils	1V748262	Wafer Assy. Includes channels 2-12, L206, C202, C203, C204
L206	Ant. Coil	24A744031	Channel 13
L207	RF Choke	24A739397	
L208	RF Coil	24A739361	Channel 13
L209	RF Coils	1V743447	Wafer Assy. Includes channels 2-12, L208, C208, C211, R208

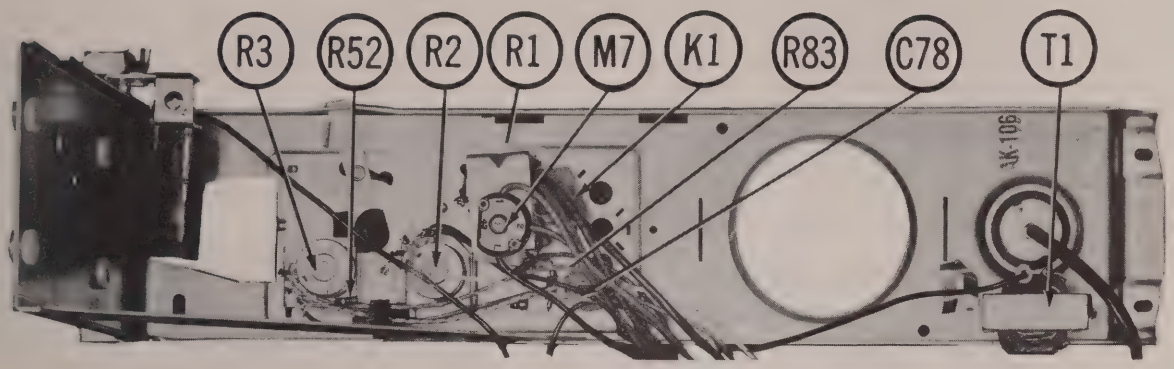
† Part of M201 (Part #1V747644.)

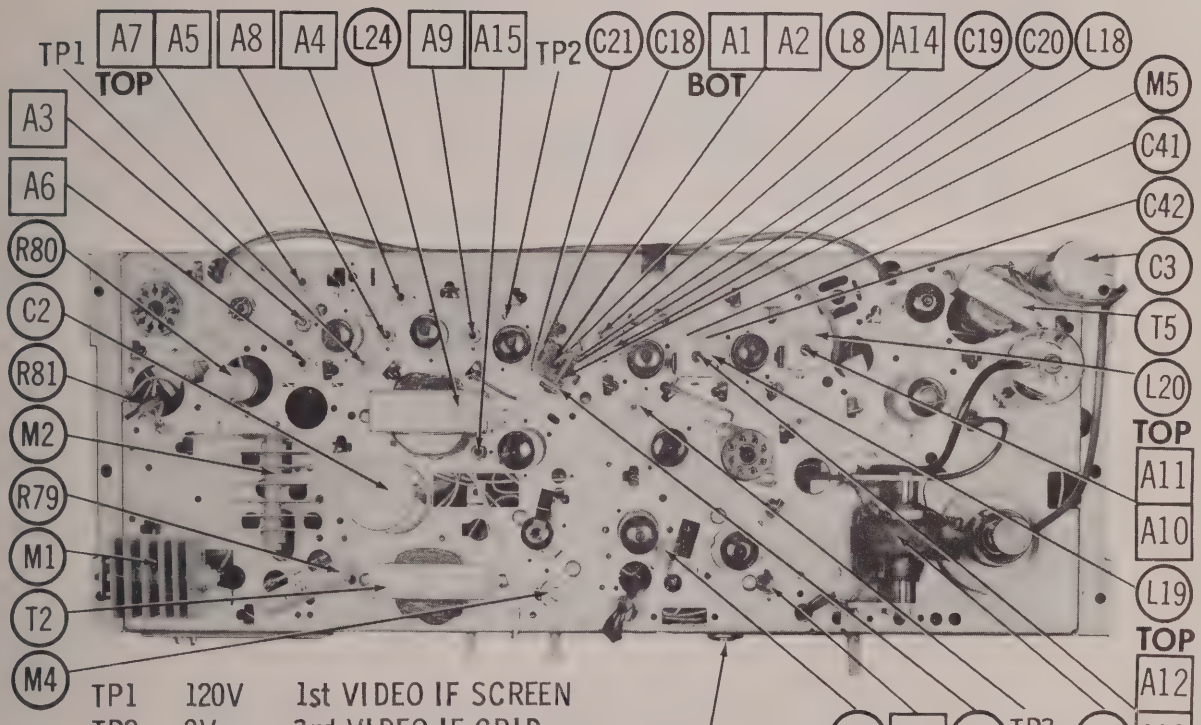
ITEM No.	USE	MOTOROLA PART No.	NOTES
L210	Mixer Grid Coils	1V738859	Wafer Assy. Includes channels 2-12, L211, C212
L211	Mixer Grid Coil	24A741232	Channel 13
L212	Osc. Coils	1V749506 *	Wafer Assy. Includes channels 2-13, C220, C221, R210, R211
L213	Mixer Plate Coil	24B474599	

* Used in TT-107. Tuner TT-106 uses Part #1V749505.

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M201	Antenna Input Assy	1V747644	Includes C201, K201, K202, L201, L202, L203 & L204
	Spring	41A740142	Compression, Clutch Bushing
	Spring	41A738627	Grounding, Channel Selector Shaft
	Spring	41A739864	Tension, Clutch Lever
	Spring	41A750106	Tension, Offset Fine Tuning Shaft
	Spring	41A749985	Torque, Fine Tuning Shaft





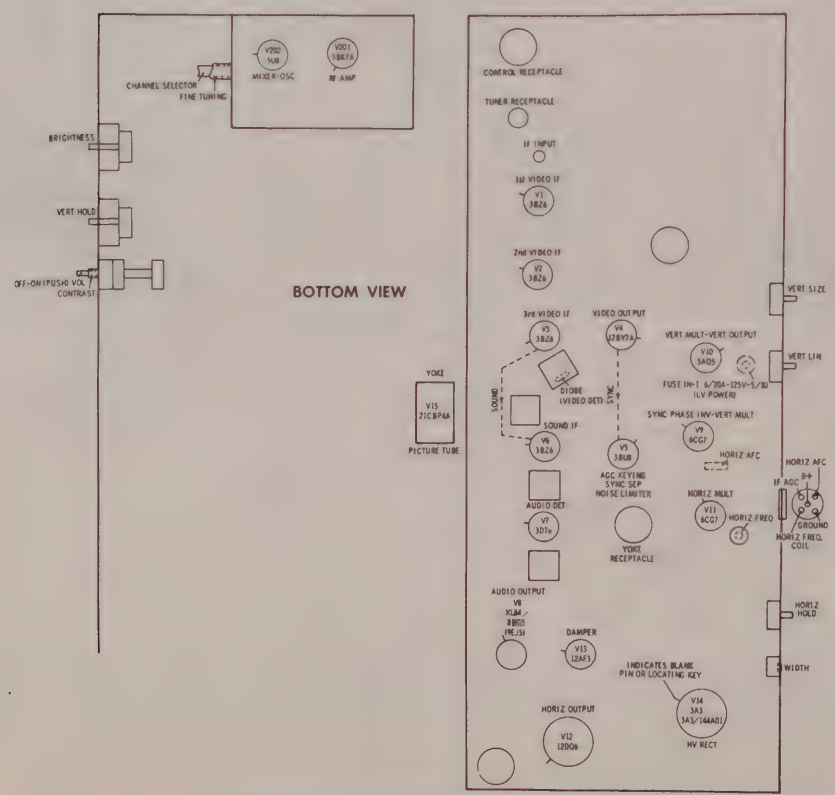
TP1	120V	1st VIDEO IF SCREEN
TP2	0V	3rd VIDEO IF GRID
TP3	-.5V	VIDEO OUTPUT GRID
TP4	-.5V	AGC
TP5	230V	HORIZ MULT
TP6	0V	GROUND
TP7	.7V	AFC
TP8	255V	B+

CHASSIS TOP VIEW

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	
V1	3BZ6	685K	47Ω	12Ω	11.5Ω	†8200Ω	†8200Ω	0Ω			
V2	3BZ6	680K	47Ω	11.5Ω	11Ω	†8200Ω	†8200Ω	0Ω			
V3	3BZ6	1000Ω	120Ω	11.5Ω	10.5Ω	†8200Ω	†8200Ω	0Ω			
V4	12BY7A	•15Ω	72K	0Ω	10.5Ω	10.5Ω	19Ω	†5600Ω	†10K	0Ω	
V5	3BU8	†3900Ω	†47K	2.8meg	3.5Ω	3Ω	†40K	†870K	†2.5meg	†3.8meg	
V6	3BZ6	4700Ω	220Ω	6.5Ω	6Ω	†11K	†70K	0Ω			
V7	3DT6	7.5Ω	560Ω	2.5Ω	3Ω	†390K	†22K	560K			
V8	XL84 8BQ5	0Ω	0Ω	180Ω	13.5Ω	12Ω	NC	†840Ω	NC	†470Ω	
V9	6CG7	•†2meg	• 1.7meg	0Ω	8Ω	6.5Ω	†33K	56K	2200Ω	0Ω	
V10	5AQ5	1.7meg	0Ω	8Ω	9Ω	†600Ω	†150Ω	1.7meg			
V11	6CG7	†60K	80K	1000Ω	4.5Ω	6Ω	†12K	4.7meg	1000Ω	NC	
V12	12DQ6	TP	15.5Ω	NC	•†8000Ω	1meg	TP	13.5Ω	0Ω	TOP CAP †9Ω	
V13	12AF3	NC	†2.5Ω	NC	15.5Ω	18Ω	NC	NC	TP	†2.5Ω	TOP CAP ¶6meg
V14	3A3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †260Ω	
V15	21CBP4A	3.5Ω	100K	Pin 6 †360K	Pin 10 †360K	Pin 11 •270K	Pin 12 4.5Ω				
V201	5BK7A	†470Ω	INF	INF	0Ω	1Ω	INF	3.5meg	0Ω	INF	
V202	5U8	†12K	44K	†270K	1Ω	2.5Ω	†15K	0Ω	0Ω	15K	
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 260V SOURCE.
† MEASURED FROM TOP CAP OF V13.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MUNTZ MODELS
21LTS, 24LTS (Ch. J)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MUNTZ MODELS
21LTS, 24LTS (Ch. J)

MODEL 21LTS (Ch. J)

MUNTZ MODELS
21LTS, 24LTS (Ch. J)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 444 FOLDER 2

PHOTOFACT* Folder

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 21LTS

1. Remove 4 metal screws holding side control escutcheon.
2. Remove 6 push-on type knobs.
3. Remove 7 metal screws holding the rear cover. Remove the rear cover.
4. Remove picture tube socket, HV, speaker and picture tube grounding leads, and yoke clamp. Remove yoke from picture tube.
5. Remove 1 metal screw holding tuner bracket on inside.
6. Remove 4 bottom chassis bolts.
7. Remove chassis.
8. Remove 1 metal screw holding upper right hand corner of picture tube and 2 metal screws from the bottom holding tube cradle. Remove picture tube.

MUNTZ MODELS
21LTS, 24LTS (Ch. J)

MODEL 21LTS (Ch. J)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

MUNTZ MODELS
21LTS, 24LTS (Ch. J)

TRADE NAME	Muntz Models 21LTS, 24LTS (Ch. J)
MANUFACTURER	Muntz TV Inc., 1000 Grey Avenue, Evanston, Illinois
TYPE SET	Television Receiver
TUBES	VHF-Twelve, UHF-Thirteen
POWER SUPPLY	108-125 Volts AC, 60 Cycle RATING 121 Watts, 1.2 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF Oscillator it is necessary to remove the chassis from the cabinet. (See disassembly instructions.)

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube, and safety glass cleaning, it is necessary to remove the chassis. (See disassembly instructions.)

AGC

No provision is made to vary the AGC of this receiver.

FOCUS

No provision is made to vary the focus of this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency. (For location, see tube placement chart.)

FUSE DEVICE

A 5Ω fusible resistor (R74) is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished by a magnetic centering device located behind the yoke.

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The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of J145

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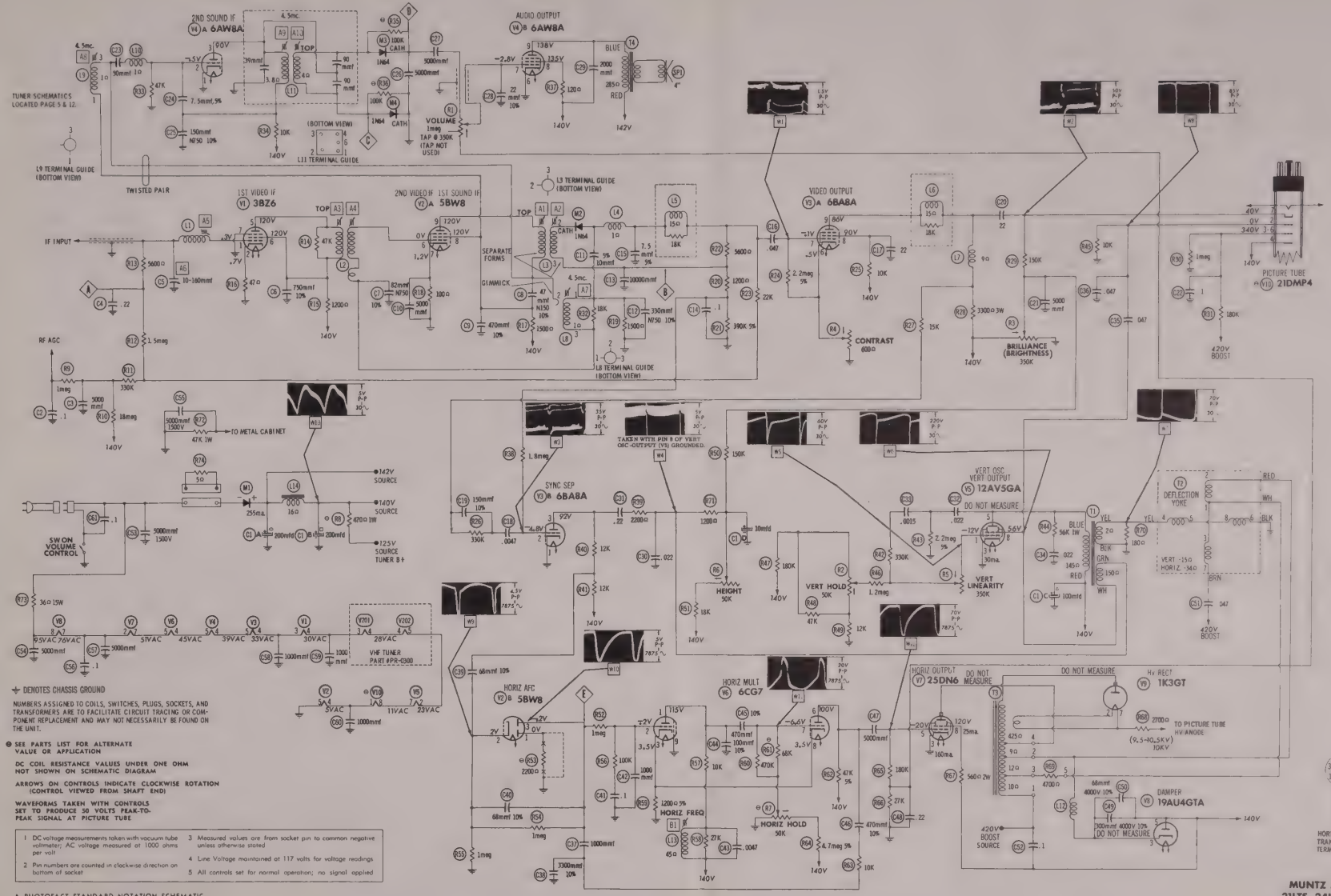
SET 444 FOLDER 2


2ND SOUND IF
V4A 6AW8A
AUDIO OUTPUT
V4B 6AW8A
TUNER SCHEMATICS LOCATED PAGE 5 & 12.
L9 TERMINAL GUIDE (BOTTOM VIEW)
TWISTED PAIR
L11 TERMINAL GUIDE (BOTTOM VIEW)
VOLUME 1meg TAP @ 350K (TAP NOT USED)
1ST VIDEO IF
V1 3BZ6
2ND VIDEO IF 1ST SOUND IF
V2A 5BW8
L3 TERMINAL GUIDE (BOTTOM VIEW)
L8 TERMINAL GUIDE (BOTTOM VIEW)
VIDEO OUTPUT
V3A 6BA8A
PICTURE TUBE
V10 21DMP4
IF INPUT
RF AGC
SEPARATE FORMS
GIMMICK
CONTRAST 600Ω
BRILLIANCE (BRIGHTNESS) 350K
420V BOOST
TO METAL CABINET
SW ON VOLUME CONTROL
142V SOURCE
140V SOURCE
125V SOURCE TUNER B+
TAKEN WITH PIN 8 OF VERT OSC-OUTPUT (V5) GROUNDED.
SYNC SEP
V3B 6BA8A
VERT OSC VERT OUTPUT
V5 12AV5GA
DO NOT MEASURE
DEFLECTION YOKE
HEIGHT 50K
VERT HOLD 50K
VERT LINEARITY 350K
VERT -15Ω HORIZ -34Ω
HORIZ AFC
V2B 5BW8
HORIZ MULT
V6 6CG7
HORIZ OUTPUT
V7 25DN6
Hv RECT
V9 1K3GT
TO PICTURE TUBE HV ANODE (9.5-10.5KV) 10KV
DAMPER
V8 19AU4GTA
HORIZ. FREQ
HORIZ HOLD 50K
HORIZ. OUTPUT TRANSFORMER TERMINAL GUIDE
VHF TUNER PART #PR-1300
95VAC 76VAC 57VAC 45VAC 39VAC 33VAC 30VAC 28VAC
11VAC 23VAC
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation; no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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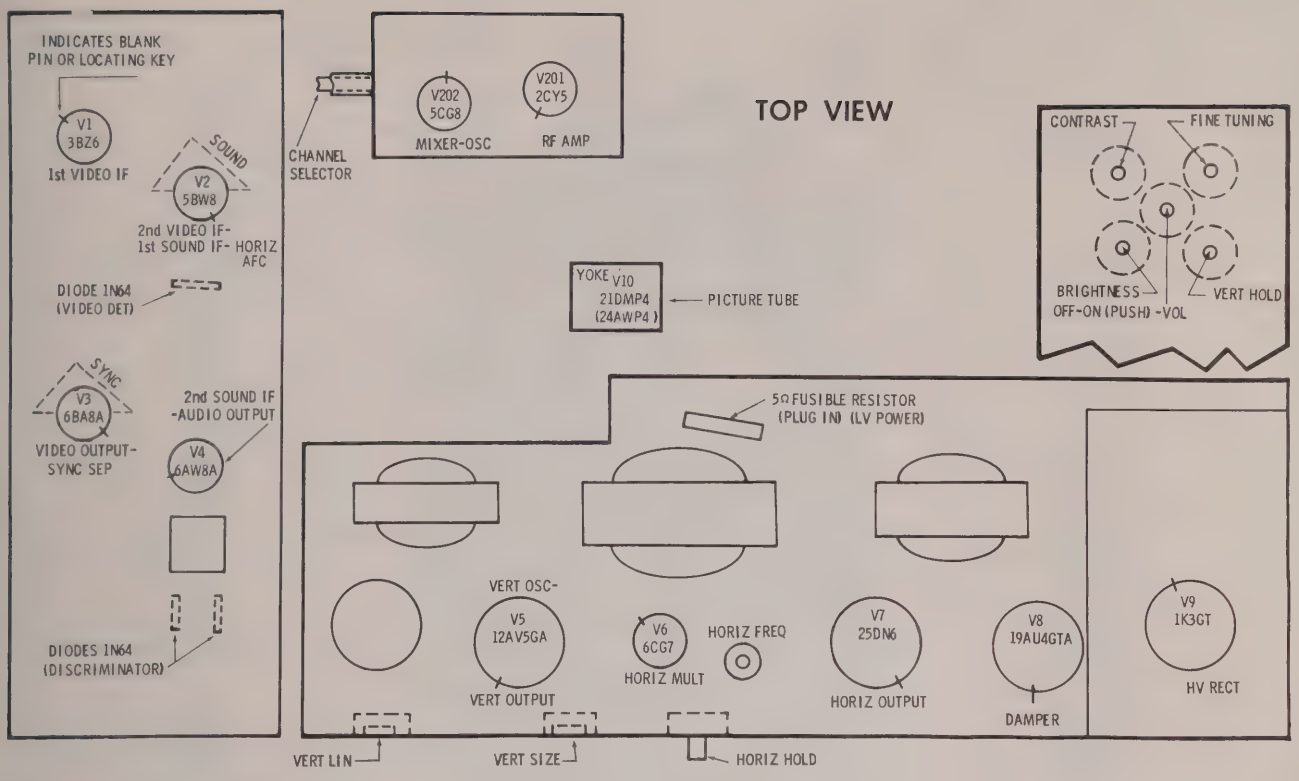
MUNTZ MODELS 21LTS, 24LTS (Ch. J)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

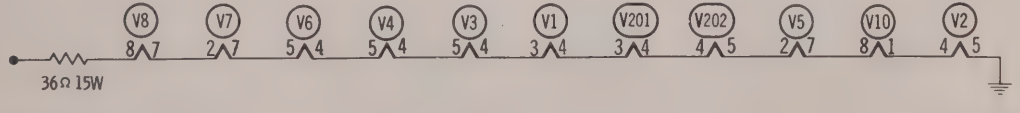
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (5Ω), Rect. (B+)

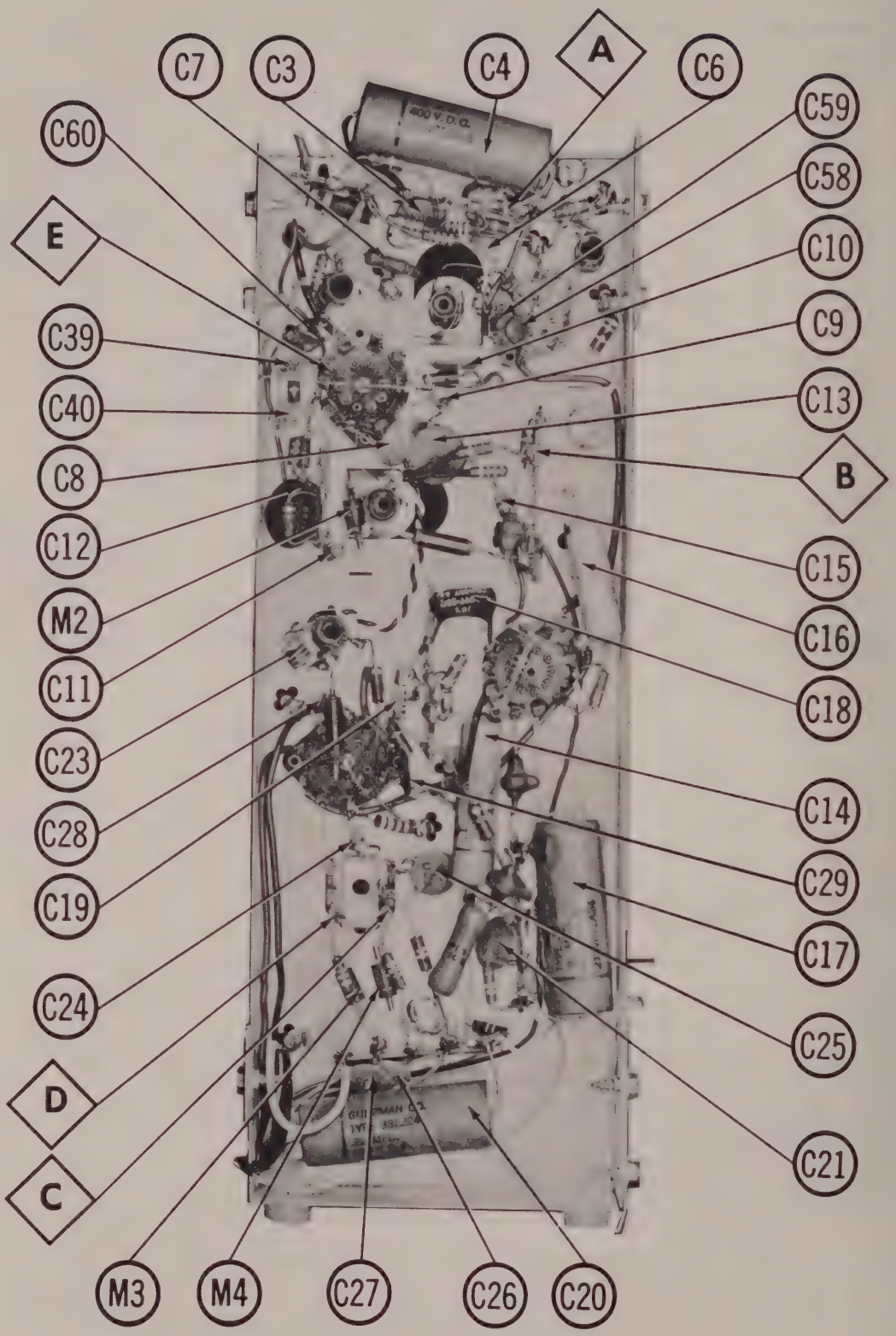
SWEEP FAILURE
No raster, has sound V2, V6, V7, V8, V9, V10, Rect. (B+)
No vertical deflection V5
Poor vert. linearity or foldover V5
Poor horiz. linearity or foldover V6, V7, V8
Narrow picture V6, V7, V8, Rect. (B+)
Vert. off freq. V5
Horiz. off freq. V6

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det.)
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V10
Has pic, no sound V2, V4

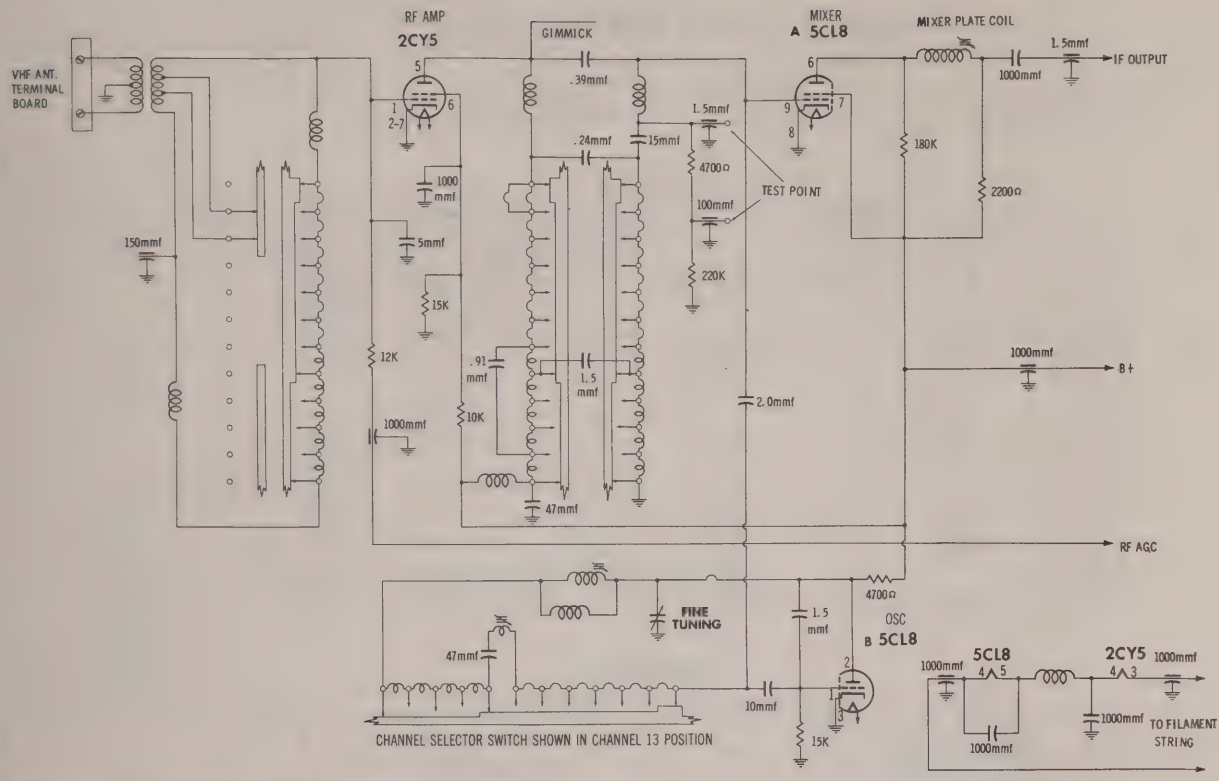
SYNC FAILURE
No vert. sync V3
No horiz. sync V3, V2
No vert. or horiz. sync V3

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)





VERTICAL CHASSIS - CAP, ALIGN, & MISC IDENTIFICATION



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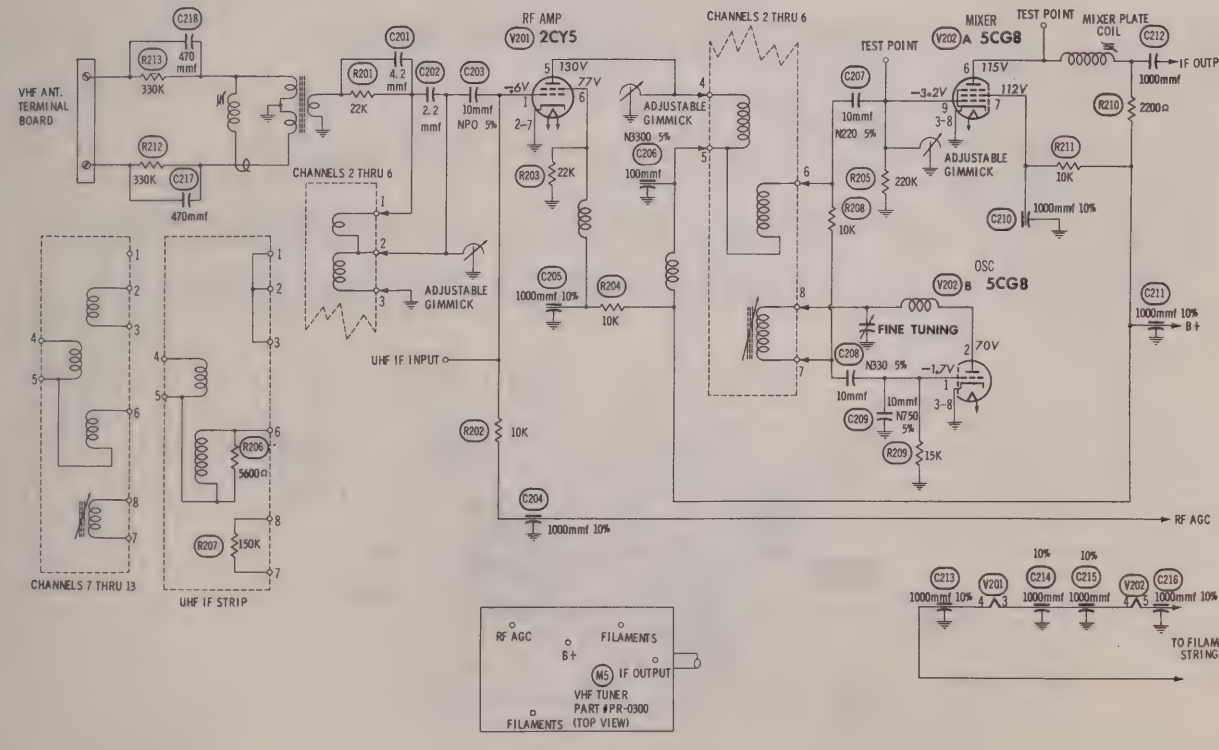
VHF TUNER PR-0293



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VHF TUNER PR-0300

TUNER PARTS LIST AND DESCRIPTIONS

PR–0300

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.		

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	4.2								5TCCB-V42S*	
C202	2.2					TCZ-2R2	C10V22C	CNO-522	5TCCB-V22	
C203	10		NPO 5%			DTZ-10	C10Q1C	CNO-410	5TCC-Q1	
C204	1000		10%		EF-001	MFT-1000			503C-D1	
C205	1000		10%		EF-001	MFT-1000			503C-D1	
C206	100		N3300 5%							
C207	10		N220 5%							
C208	10		N330 5%			TCA-10				
C209	10		N750 5%			TCN-10	C10Q1U	CN7-410	5TCU-Q1	
C210	1000		10%		EF-001	MFT-1000			503C-D1	
C211	1000		10%		EF-001	MFT-1000			503C-D1	
C212	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C213	1000		10%		EF-001	MFT-1000			503C-D1	
C214	1000		10%		EF-001	MFT-1000			503C-D1	
C215	1000		10%		EF-001	MFT-1000			503C-D1	
C216	1000		10%		EF-001	MFT-1000			503C-D1	
C217	470				BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C218	470				BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R201	22K			
R202	10K			
R203	22K			
R204	10K			
R205	220K			
R206	5600Ω			
R207	150K			

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R208	10K			
R209	15K			
R210	2200Ω			
R211	10K			
R212	330K			
R213	330K			

TUNER ALIGNMENT INSTRUCTIONS

VHF OSCILLATOR ALIGNMENT

Suggested Alignment Tools: GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531

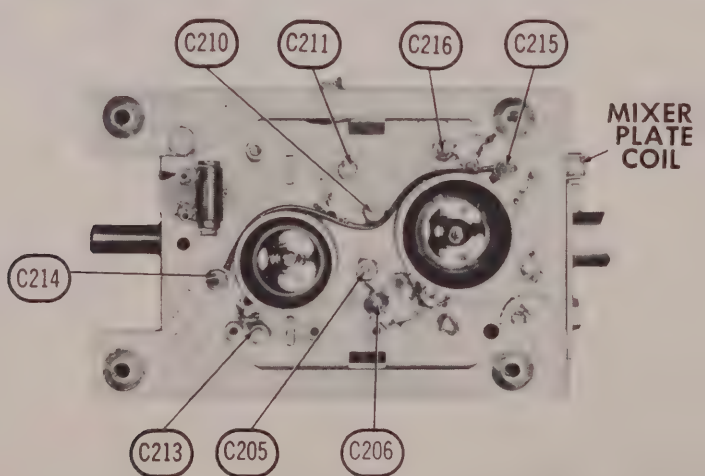
The individual channel adjustment screws are accessible one at a time, thru a hole in the front of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to channel to be adjusted and adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



TUNER PR–0300 TOP VIEW

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A5, A7 thru A10.. GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

VIDEO IF ALIGNMENT

Connect the negative lead of a 5.5 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd.	High side to pin 6 (grid) of 2nd Video IF. Low side to chassis.	44MC (10MC Swp)	41.25MC 42.5MC 43.0MC 44.75MC 45.75MC 47.25MC	Any non-interfering channel.	Vert. amp. thru 10K to point Ⓑ. Low side to chassis. (Across Video Det. load.)	A1, A2	Adjust for maximum response similar to Fig. 1 peaking at approximately 44.25MC.
2.	"	High side to pin 1 (grid) of 1st Video IF. Low side to chassis.	"	"	"	"	A3, A4	Adjust for response similar to Fig. 2.
3.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	"	"	"	A5	"
4.	"	"	"	"	"	"	A6 and Mixer Plate Coil	Adjust A6 for maximum response similar to Fig. 3. Adjust Mixer Plate Coil to control steepness of low frequency side of response curve. If necessary, retouch A5 to obtain desired response.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01mfd.	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel.	DC probe thru 10K to point Ⓒ. Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
6.	"	"	"	"	DC probe thru 10K to point Ⓓ. Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

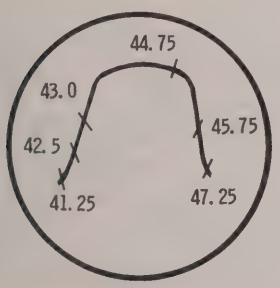


FIG. 1

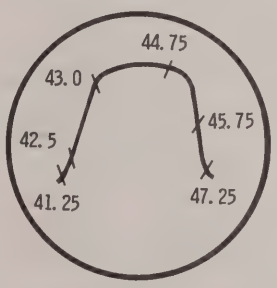


FIG. 2

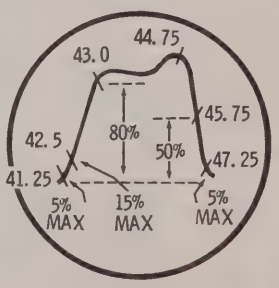


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp.	3BZ6	
V2	2nd Video IF Amp. - 1st Sound IF-Horiz. AFC	5BW8	
V3	Video Output-Sync Sep.	6BA8A	
V4	2nd Sound IF-Audio Output	6AW8A	
V5	Vert. Osc.-Vert. Output	12AV5GA	
V6	Horiz. Mult.	6CG7	
V7	Horiz. Output	25DN6	
V8	Damper	19AU4GTA	
V9	HV Rect.	1K3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	MUNTZ PART No	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No	
V10	21DMP4 24AWP4			21DMP4	① "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	MUNTZ PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	≈200	150	CE-0042	AFH54-38-95	D0338	FP411.8		TVLS-4438.1*	
B	≈200	150							
C	≈100	150							
D	30	75							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.1	200		CP-0026	P288N-1	DF-104	CUB2P1	GEM-301	2TM-P1	
C3	5000			CC-0060	BPD-005	DD-502	BYAU02B	B-250	5HK-D5	
C4	.22	200		CP-0055	P288N-22		CUB2P22	GEM-3022	2TM-P22	
C5	10-180			CT-0023						
C6	750		10%	CC-0234	DI 750		1R5T75	JL-375	5GA-T75S 10% *	
C7	82		N750 10%	CC-0157	N750-SI 82	TCN-82	C10Q82U	CNT-462	5TCU-Q82S 10% *	
C8	47		N750 10%	CC-0156	N750-DI 47	DTZ-47	C10Q47U	CNT-447	5TCU-Q47S 10% *	
C9	470		10%	CC-0159	DI 470	MD-471	5R5T47	JL-347	5GA-T47S 10% *	
C10	3000			CC-0166	BPD-005	DD-502	BYAU05	B-250	5HK-D5	
C11	10		5%	CC-0184	NPO-SI 10	TCZ-10	L10Q1	CNO-410	5GA-Q1S 10% *	
C12	330		N750 10%	CC-0160	N750-SI 330	TCN-750	C10T33U	CNT-333	5TCU-T33S 10% *	
C13	10000			CC-0187	BPD-01	DD-103	BYAU08	B-110	5HK-S1	
C14	.1	300		CP-0026	P288N-1	DF-104	CUB2P1	GEM-301	3TM-P1	
C15	7.5		5%	CC-0153		DD-7R5			5GA-V75S 5% *	
C16	.047	200		CP-0068	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C17	.22	400			P488N-22		CUB4P22	GEM-4022	4TM-P22	
C18	.0047	600		CPM-0113	P688N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C19	150		10%	CC-0222	DI 150	DD-151	L10T15	ZT-5315	5GA-T15S 10% *	
C20	.33	400			P488N-33		CUB4P33	GEM-4033	4TM-P33	
C21	5000			CC-0165	BPD-005	DD-502	BYAU05	B-250	5HK-D5	
C22	.1	600		CP-0013	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C23	90			CC-0134	SI 50	DD-500	L10Q8	UC-545	5GA-Q8	
C24	7.5		5%	CC-0153		DD-7R5			5GA-V75S 5% *	
C25	150		N750 10%	CC-0158	N750-DI 150	DTN-150	C10T15U	CNT-315	5TCU-T15S 10% *	
C26	5000			CC-0060	BPD-005	DD-502	BYAU05	B-250	5HK-D5	
C27	5000			CC-0060	BPD-005	DD-502	BYAU05	B-250	5HK-D5	
C28	22		10%	CC-0155	NPO-SI 22	D6-220	L10Q22	CNO-422	5GA-Q22S 10% *	
C29	2000			CC-0160	BPD-002	DD-202	BYAU02	B-220	5HK-D2	
C30	.022	200		CPM-0108	P288N-022		CUB2S22	GEM-4122	2TM-S22	
C31	.22	200		CP-0055	P288N-22		CUB2P22	GEM-3022	2TM-P22	
C32	.022	600		CP-0053	P688N-022		CUB6S22	GEM-6122	6TM-S22	
C33	.0015	600			P688N-0015	D6-152	CUB6S15	GEM-6215	6TM-D15	
C34	.022	600		CP-0053	P688N-022		CUB6S22	GEM-6122	6TM-S22	
C35	.047	600		CP-0064	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C36	.047	200		CP-0068	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C37	1000			CC-0194	BPD-001	DD-102	BYAU01DM	B-210	5HK-D1	
C38	3300		10%	CC-0226	DI 3300	DD-332	PM6D33	JL-233	6TM-D33	
C39	68		10%	CC-0145	DI 68	DD-680	L10Q68	CNO-468	5GA-Q68S 10% *	
C40	68		10%	CC-0145	DI 68	DD-680	L10Q68	CNO-468	5GA-Q68S 10% *	
C41	.1	300		CP-0026	P288N-1	DF-104	CUB2P1	GEM-301	2TM-P1	
C42	1000			CC-0117	BPD-001	DD-102	BYAU01DM	B-210	5HK-D1	
C43	.0047	600		CPM-0113	P688N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C44	100		10%	CC-0163	DI 100	DD-101	L10T1	ZT-531	6TM-T1	
C45	470		10%	CM-0048	1464-00047	MD-471	22R5T47	JL-347	MS-347	
C46	470		10%	CM-0048	1464-00047	MD-471	22R5T47	JL-347	MS-347	
C47	5000			CC-0060	BPD-005	DD-503	BYAU05	B-250	5HK-D5	
C48	.22	400			P488N-22		CUB4P22	GEM-4022	4TM-P22	
C49	300	4000	10%	CC-0227				6DY-468		
C50	68	4000	10%	CC-0137				6DY-468		
C51	.047	600		CP-0064	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C52	.1	400		CP-0034	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C53	5000	1500		CC-0133	DAC-9	DD30-502	HVE15D5	GEM-1625	20HK-D5	
C54	5000			CC-0060	BPD-005	DD-503	BYAU05	B-250	5HK-D5	
C55	5000	1500		CC-0133	DAC-9	DD30-502	HVE15D5	GEM-1625	20HK-D5	
C56	.1	400		CP-0034	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C57	5000			CC-0060	BPD-005	DD-503	BYAU05	B-250	5HK-D5	
C58	1000			CC-0131	BPD-001	DD-102	BYAU01DM	B-210	5HK-D1	
C59	1000			CC-0131	BPD-001	DD-102	BYAU01DM	B-210	5HK-D1	
C60	1000			CC-0131	BPD-001	DD-102	BYAU01DM	B-210	5HK-D1	
C61	.1	600		CP-0013	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-0069				PP16L	Volume, Tap ② 350K
B	Switch						Not Req.	Push-Push Off-On
R2A	50K	½	VC-0067	AB-31	B47-50K-S	QU-123	PTA54L	Vert. Hold
B	Shaft			AK-19	Not Req.	TQ	Not Req.	

CONTROLS (cont)

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R3A	350K	½	VC-0066	AB-59	B47-500K-S	QU-132	PTA55L	Brilliance (Brightness)
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R4A	600Ω	½	VC-0064	AB-4	B47-500-S	QU-103	PTA52L	Contrast
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R5A	350K	½	VC-0065	AB-59	B47-50K-S	QU-132	PTA55L	Vert. Lin.
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R6A	50K	½	VC-0068	BX-31	B47-50K-S	QU-123	PTA54L	Height
B	Shaft			Not Req.	Not Req.	TQ	Not Req.	
R7A	50K	½	VC-0067	AB-31	B47-50K-S	QU-123	PTA54L	Horiz. Hold, Note 1
B	Shaft			AK-19	Not Req.	TQ	Not Req.	

Note 1. Some versions may use 50K in this application (Part #VC-0062-1).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R8	470Ω	1	RC-470-11	Note 1
R9	1meg		RC-1004-18	
R10	18meg		RC-1805-18	
R11	330K		RC-3303-18	
R12	1.5meg		RC-1504-18	
R13	5600Ω		RC-5601-18	
R14	47K		RC-4702-18	
R15	1200Ω		RC-1201-18	
R16	47Ω		RC-047-18	
R17	1500Ω		RC-1501-18	
R18	100Ω		RC-100-18	
R19	1500Ω		RC-1501-18	
R20	1200Ω		RC-1201-18	
R21	390K 5%			
R22	5600Ω		RC-5601-18	
R23	33K		RC-3303-18	
R24	2.2meg 5%			
R25	10K		RC-1002-18	
R26	330K		RC-3303-18	
R27	18K		RC-1803-18	
R28	3300Ω	3	RG-3301-13	
R29	180K		RC-1503-18	
R30	1meg		RC-1004-18	
R31	180K		RC-1803-18	
R32	18K		RC-1803-18	
R33	47K		RC-4702-18	
R34	10K		RC-1002-18	
R35	100K		RC-1003-18	Note 2
R36	100K		RC-1003-18	Note 2
R37	120Ω		RC-120-18	
R38	1.8meg		RC-1804-18	
R39	2200Ω		RC-2201-18	
R40	12K		RC-1202-18	
R41	12K		RC-1202-18	
R42	330K		RC-3303-18	
R43	2.2meg 5%			
R44	56Ω	1	RC-5601-11	
R45	10K		RC-1002-18	
R46	1.2meg		RC-1204-18	
R47	180K		RC-1803-18	
R48	47K		RC-4702-18	
R49	12K		RC-1202-18	
R50	150K		RC-1503-18	
R51	18K		RC-1802-18	
R52	1meg		RC-1004-18	
R53	2200Ω		RC-2201-18	Note 3
R54	1meg		RC-1004-18	
R55	1meg		RC-1004-18	
R56	100K		RC-1003-18	
R57	10K		RC-1002-18	
R58	27K		RC-2703-18	
R59	1200Ω 5%		RC-1201-58	
R60	470K		RC-4703-18	
R61	68K		RC-6802-18	Note 4
R62	47K 5%			
R63	10K		RC-1002-18	
R64	4.7meg 5%			
R65	180K		RC-1803-18	
R66	27K		RC-2702-18	
R67	560Ω	2	RC-560-12	
R68	2700Ω		RC-2701-18	
R69	4700Ω		RC-4701-18	
R70	180Ω		RC-180-18	
R71	1200Ω		RC-1201-18	
R72	47K	1	RC-4702-11	
R73	36Ω	15	RW-0048	
R74	5Ω		RW-005-13	

Note 1. Some versions may use 1000Ω 1W in this application (Part #RC-1001-11).
Note 2. Some versions may use 180K in this application (Part #RC-1803-18).
Note 3. Not used in some versions.
Note 4. Some versions may use 82K in this application (Part #RC-8202-18).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MUNTZ PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	
L1	1st Video IF	LC-0102	17-4534	TV-131		VF-4	
L2	2nd Video IF	LC-0103					
L3	3rd Video IF	LC-0104					
L4	RF Choke	LC-0091					4.7 Microhenries
L5	Series Peaking Coil	LC-0101-3	19-3250 ▲	TV-185 ▲	6130 ▲	VP-6 ▲	270 Microhenries, wound on 18K resistor
L6	Series Peaking Coil	LC-0101-2	19-3250 ▲	TV-185 ▲	6130 ▲	VP-6 ▲	270 Microhenries, wound on 18K resistor
L7	Shunt Peaking Coil	LC-0101-1	19-3125	TV-196	6153	VP-4	120 Microhenries
L8	1st Sound IF	LC-0105					
L9	2nd Sound IF	LC-0106					
L10	RF Choke	LC-0092		SW-631			4.7 Microhenries
L11	Discriminator	LC-0076					
L12	Resonant Choke	LC-0098					10 Microhenries

▲ Parallel with 18K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MUNTZ PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L13	45Ω		LO-0077		TV-163 *	6210 *	H-102 *	H8-5 *	Horiz. Freq. * Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA							
	CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ~(/)	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	
L14	.290A	16Ω	.7 Hy.	LC-0100-2	36C92		F-801	C-3328	36C92	C-40X	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							
		MUNTZ PART No	Halldorson PART No	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	Vert. Output	TO-0056							
T2	Yoke-Horiz. (20MH) (110°)-Vert. (16MH)	LC-0106	Y-52 ① ②		Y-110 ① ④		DY-27A ① ③	Y-52 ① ③	Y-60 ③ YC-110
	Rear Cover & Centering Device	[illegible]							CL-1
	Yoke Clamp	SP-0079							D-95 ③
T3	Horiz. Output	TO-0054							

① Remove Horizontal and Vertical Damping networks from yoke. Use original rear cover and centering device.
② Connect same as original.
③ Drill new mounting hole(s).

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	4							5
	2							4
	3							YCT
	1							1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	6000Ω	3-4Ω	TO-0049-2	26S49	A-3019	AU-604	A-8092	26S49	S-5Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP	MUNTZ PART No.	QUAM PART No	
SP1	4"	PM	3.2Ω	SK-0033-3	4A15	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	MUNTZ PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.025S	CX-0037 ①	HA504 ①	SD-500 ①	40K ①	① Siltron

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MUNTZ PART No.	CBS PART No.	SYLVANIA PART No	
M2	1N54	CX-0036	1N54	1N60	Video Detector
M3	1N54	CX-0036	1N54	1N60	Discriminator
M4	1N54	CX-0036	1N54	1N60	Discriminator

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M4	Tuner	PR-0300	VHF
	Tuner	PR-0299	VHF
	Tuner	PR-0293	VHF
	Tuner	PR-0302	UHF

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

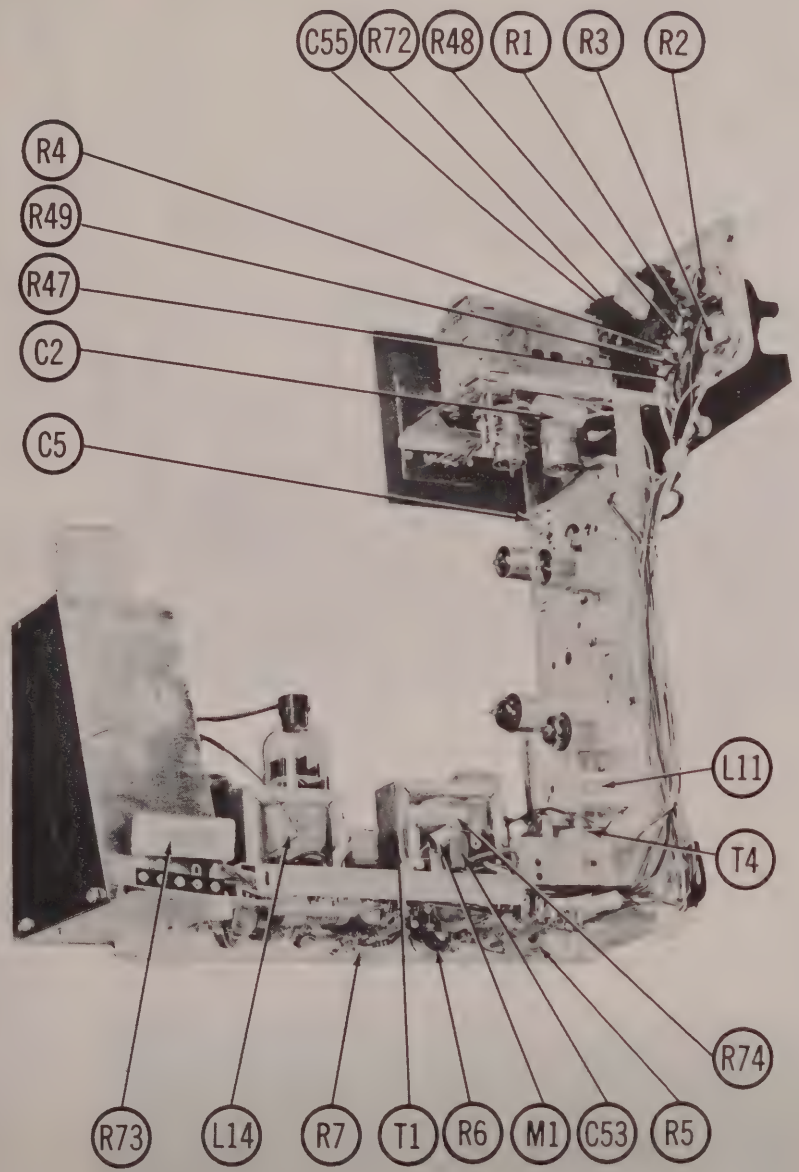
NAME	PART NO.	DESCRIPTION
Safety Glass	WG-0019-4	21"
Safety Glass	WG-0019-5	24"
Mask	KS-0078	21"
Mask	KS-0081	24"
Knob	KB-0079	Fine Tuning, Contrast
Knob	KB-0079-2	On-Off-Volume
Knob	KB-0079-3	Vert. Hold, Brilliance
Cabinet	MC-0106	21" Metal
Cabinet	MC-0106	24" Metal

WIRING DATA

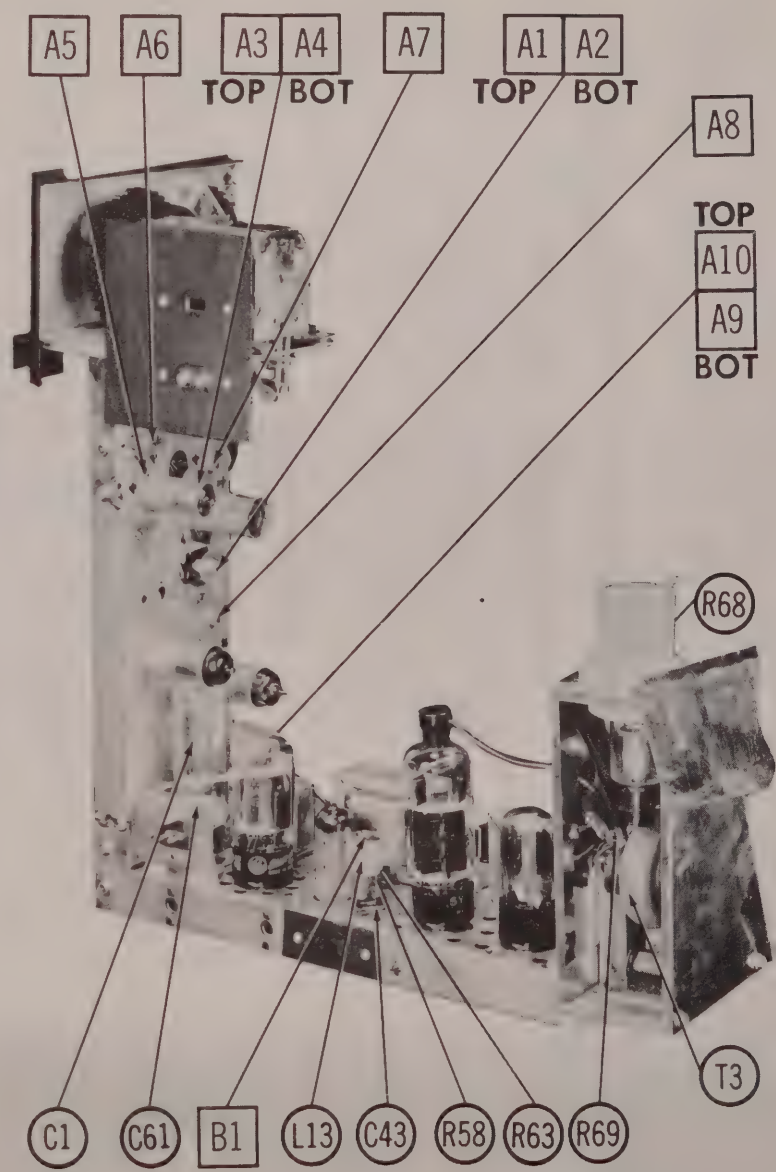
High Voltage Lead	Use BELDEN No. 8669
Shielded Hook-up Wire	Use BELDEN No. 8685 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8674
300Ω Tuner Input Lead	Use BELDEN No. 8235
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

MUNTZ MODELS 21LTS, 24LTS (Ch. J)

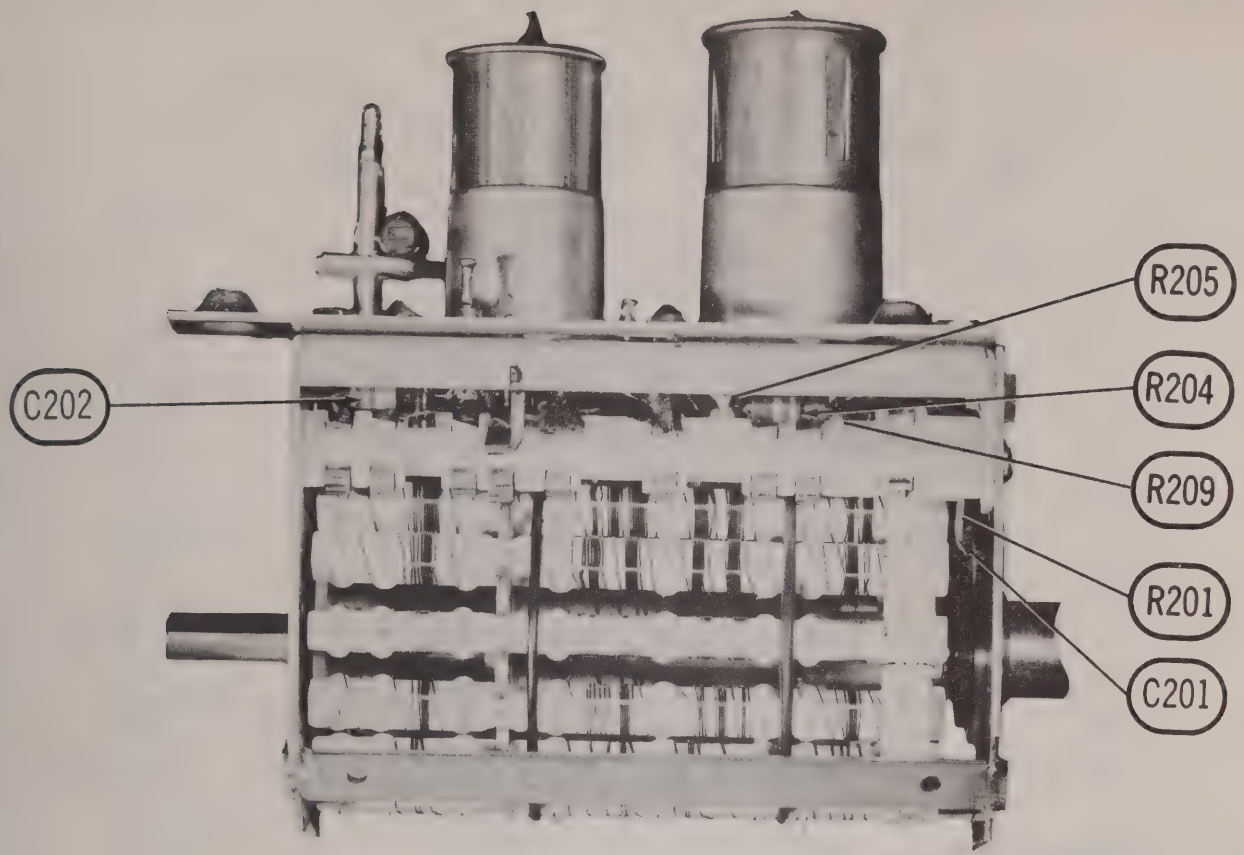
FOLDER 2



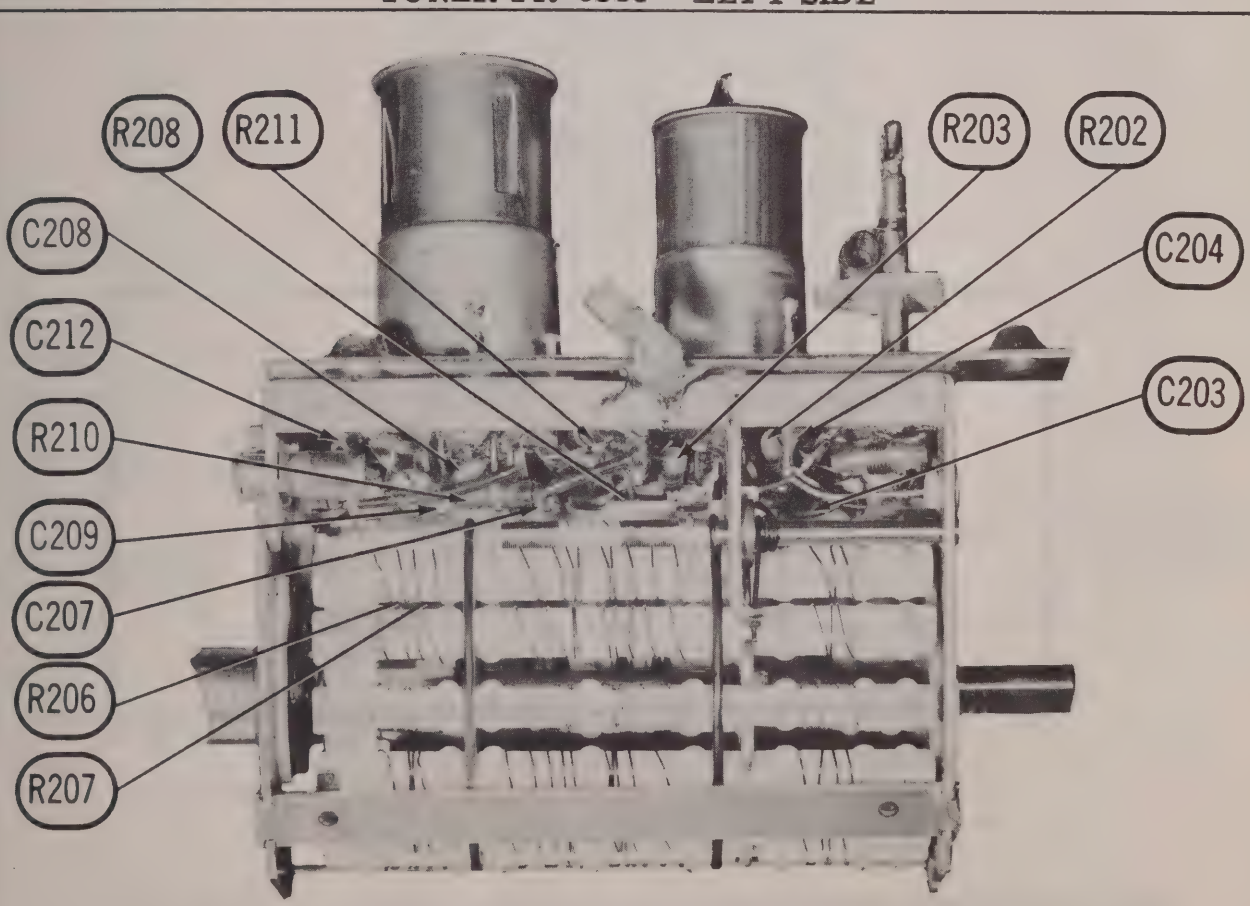
CHASSIS - FRONT VIEW



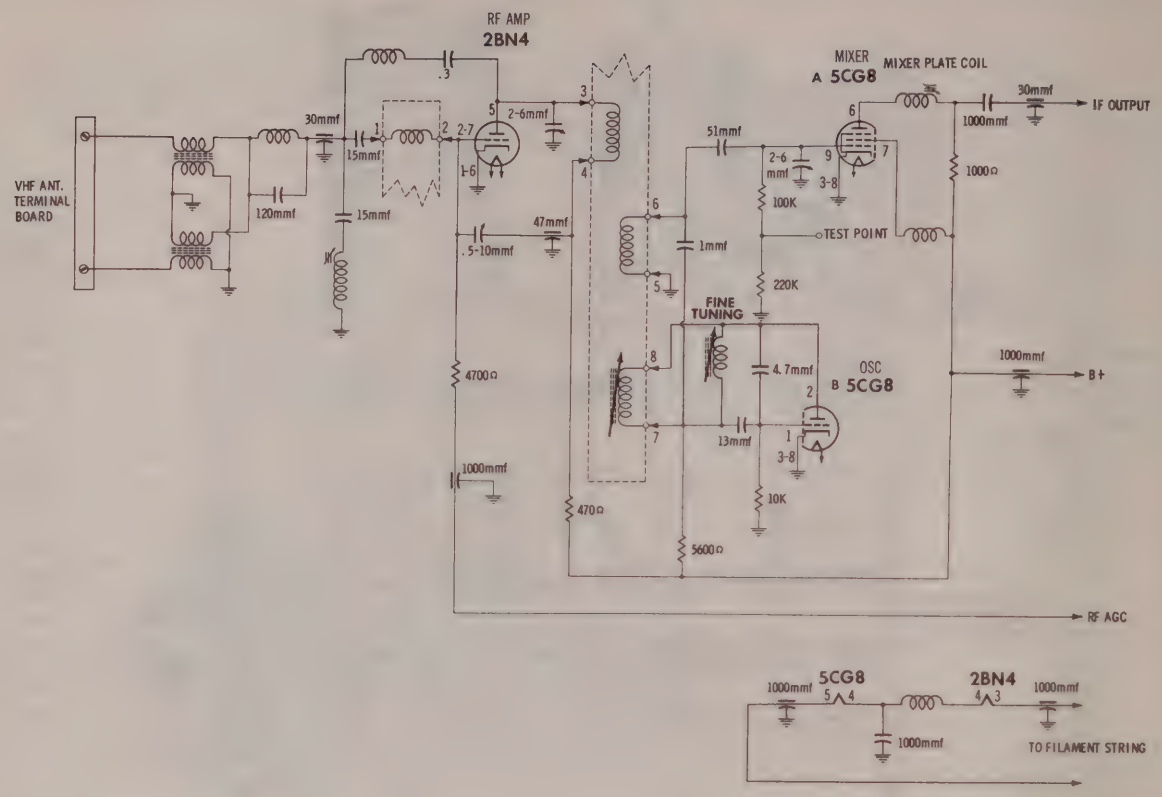
CHASSIS - REAR VIEW



TUNER PR-0300 - LEFT SIDE



TUNER PR-0300 - RIGHT SIDE



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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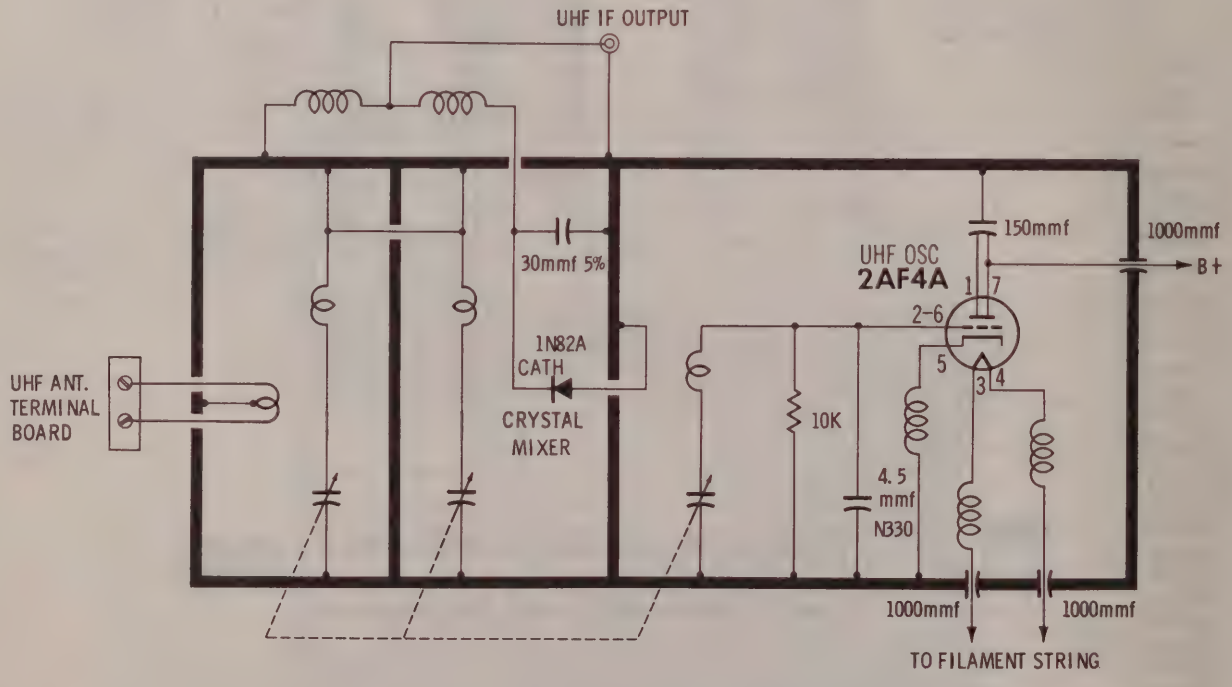
VHF TUNER PR-0298



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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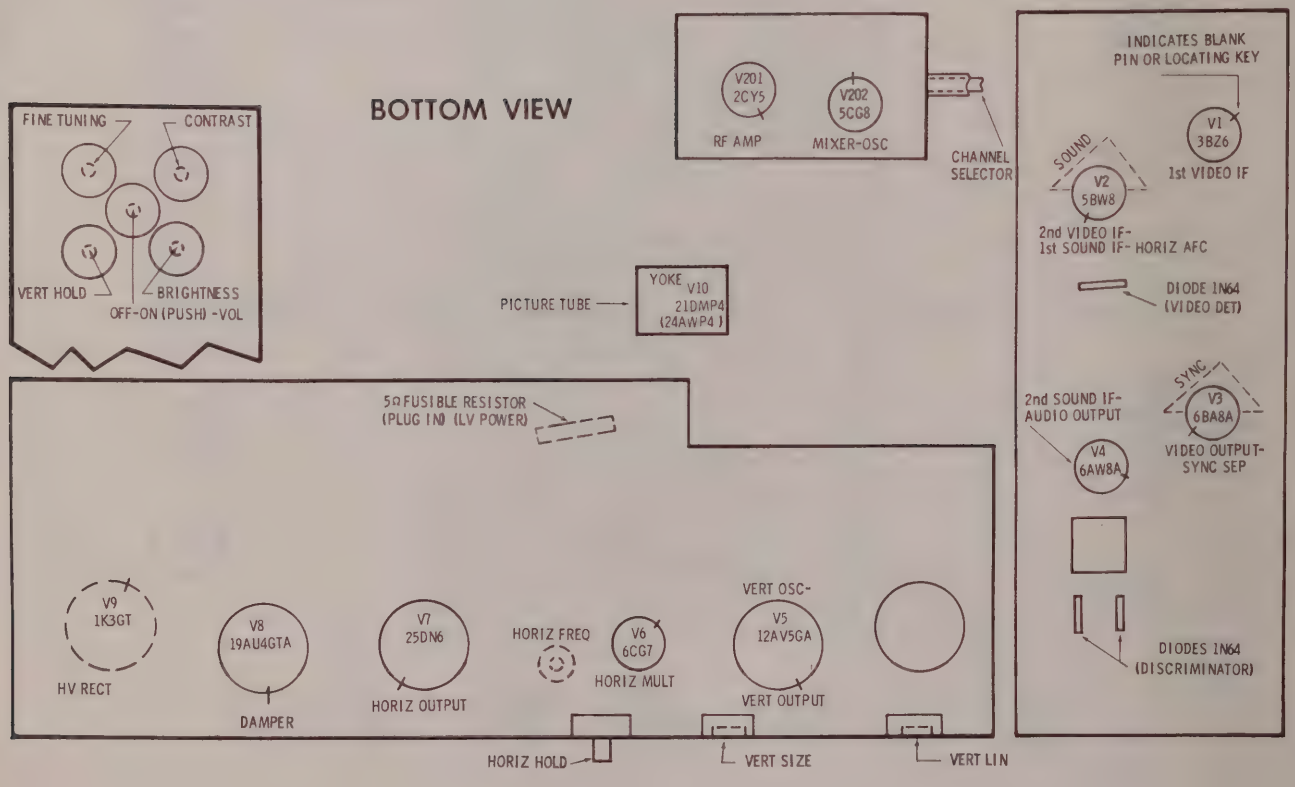
UHF TUNER PR-0302

VERTICAL CHASSIS - RESISTOR, INDUCTOR IDENTIFICATION

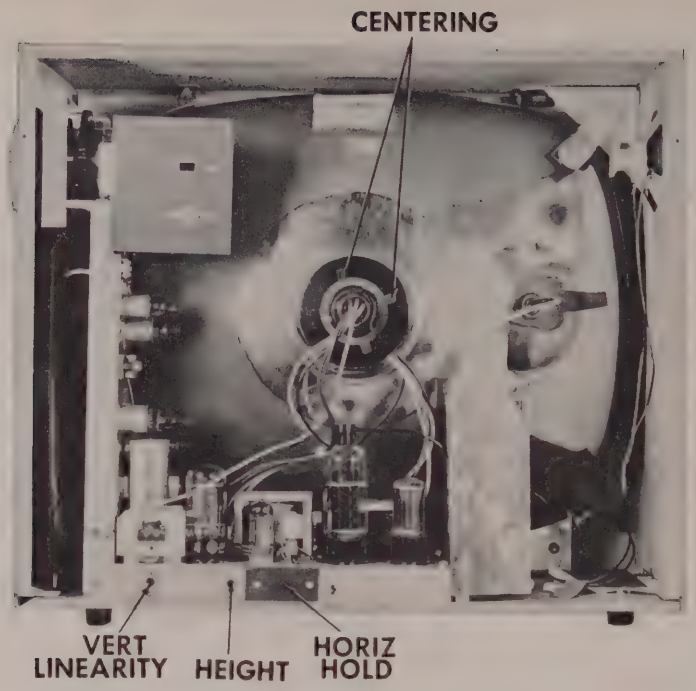
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	1.8meg	47Ω	6.5Ω	6Ω	†1200Ω	†1200Ω	0Ω		
V2	5BW8	2200Ω	1meg	2meg	1Ω	0Ω	1500Ω	100Ω	†1500Ω	†1500Ω
V3	6BA8A	0Ω	2.2meg	†24K	6.5Ω	8Ω	•40Ω	2.2meg	†10K	†3300Ω
V4	6AW8A	0Ω	47K	†10K	8Ω	9.5Ω	0Ω	27K	†120Ω	†285Ω
V5	12AV5GA	•1.2meg	4.5Ω	0Ω	TP	†160Ω	NC	2.5Ω	•†30K	
V6	6CG7	†10K	3meg	1200Ω	9.5Ω	11Ω	†47K	•80K	1200Ω	0Ω
V7	25DN6	NC	16Ω	0Ω	NC	200K	NC	11Ω	†575Ω	TOP CAP ‡8Ω
V8	19AU4GTA	NC	NC	¶1meg	NC	†16Ω	NC	16Ω	20Ω	
V9	1K3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡435Ω
V10	21DMP4	1Ω	10K	‡180K	†0Ω	NC	‡180K	•180K	2.5Ω	
V201	2CY5	1.8meg	0Ω	6Ω	5.5Ω	†470Ω	†10K	0Ω		
V202	5CG8	15K	†10K	0Ω	5.5Ω	4.5Ω	†2700Ω	†10K	0Ω	220K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 142V SOURCE.
‡ MEASURED FROM PIN 3 OF V8.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:
GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

Turn the set on and tune in a TV station, preferably with a test pattern. Allow the receiver a few minutes warm-up time.

Adjust controls for a normal picture.

Connect a clip lead across the Horizontal Frequency coil (L16).

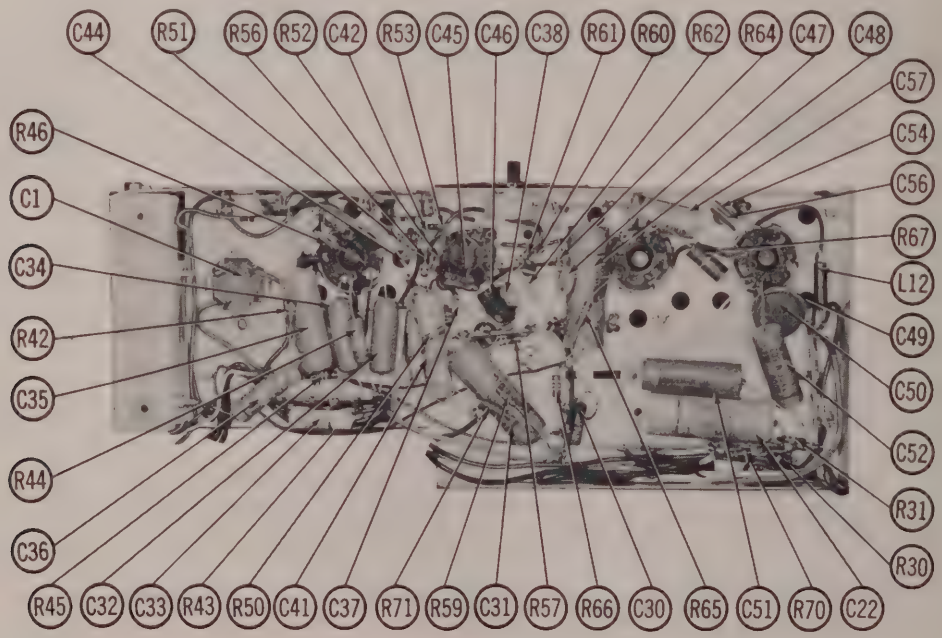
Connect a clip lead from point (E) to chassis.

Adjust the Horizontal Hold control (R7) until a single picture is attained.

Remove the short from L16. Adjust the Horizontal Frequency slug (B1) with the slug entering the coil from the chassis side until a single picture is attained, then turn B1 1/4 turn counterclockwise for final setting of the slug.

Remove the clip lead from point (E) and picture should snap into sync.

Turn the Horizontal Hold control fully clockwise, then turn slowly counterclockwise until the picture falls into sync. With this setting of the Horizontal Hold control, the picture should remain in sync regardless of the signal level.



HORIZONTAL CHASSIS

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PRODUCTION CHANGE BULLETIN 220

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 331

H. H. SCOTT MODEL 311-C

H. H. Scott Model 311-A was covered in PHOTOFACT Folder 13 - Set 331.

Model 311-C is electrically identical except for the following changes given in this bulletin.

COMPONENT CHANGES

A 1500Ω resistor is added across M6 (Meter).

A 100K resistor is added in series with junction of R2 and C7 to junction of R12, R4 and C6.

C12 is omitted.

C13 is omitted.

C14 is decreased from 47mmf to 15mmf.

C16 is decreased from 47mmf to 15mmf.

R11 is increased from 220Ω to 390Ω.

R13 is increased from 220Ω to 390Ω.

C18 is decreased from 47mmf to 15mmf.

C23 is omitted.

C24 is decreased from 4700mmf to 1000mmf.

R10 is increased from 4700Ω to 10K.

R22 is increased from 1000Ω to 1500Ω.

The junction of R27 and R26 is connected to pin 9 of V6 (12AU7).

A .001mfd @ 1600V is added from the primary winding of T1 (Power Transformer) to ground.

A .001mfd capacitor is added across the primary winding of T1 (Power Transformer).

A 750Ω 4W resistor is added in series with pin 7 of V7 (6X4) and junction of C1A and R39C.

An additional pilot light (#47) is added.

An 18Ω resistor is added in series with the added #47 pilot light and the original M4 (pilot light).

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 6 IN SET 345

MAGNAVOX CHASSIS AMP-150BB, CB, DB

Magnavox Chassis AMP-150AA was covered in PHOTOFACT Folder 6 - Set 345.

Chassis AMP-150BB, 150CB, 150DB are electrically identical except for the following changes.

COMPONENT CHANGE

Ch. 150DB

T2 (Low Freq. Transformer) is changed to Part #320080-1.

Ch. 150CB, 150DB

R2 is decreased from 15K to 10K.

R17 is omitted.

A 2200Ω resistor is added across C12.

C5 is increased from .015 to .033.

C12 is increased from .033 to .068.

C11 is increased from .015 to .033.

PRODUCTION CHANGE
BULLETIN 220

PRODUCTION CHANGE
BULLETIN 220

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET 398

MAGNAVOX CHASSIS U24-05AA, U24-07AA, U24-08AA, V24-05AA, V24-07AA, V24-08AA

Spartan Chassis U24-01AA, U24-02AA, U24-03AA, U24-04AA, U24-06AA, V24-01AA, V24-02AA, V24-03AA, V24-04AA, V24-06AA (24 Series) were covered in PHOTOFACT Folder 4 - Set 398.

Chassis U24-05AA, U24-07AA, U24-08AA, V24-05AA, V24-07AA, V24-08AA are electrically identical except for the changes given in this bulletin.

COMPONENT CHANGES

A 680mmf capacitor is added from junction of C2D, C3 and pin 8 of 6DG6GT (Audio Output) to ground.

R2 is decreased from 3000Ω to 2400Ω in the U24-07AA chassis.

C5 is omitted in the U24-07AA chassis.

R12 is increased from 1000Ω to 1500Ω.

R13 is increased from 1000Ω to 1500Ω.

R15 is increased from 36K to 47K.

R16 is increased from 1000Ω to 1500Ω.

R9 is increased from 1000Ω to 1500Ω.

R66 is decreased from 12K to 6800Ω.

A 4700Ω $\frac{1}{2}$ watt resistor is added in series with R66 to ground.

A 1000mmf Ⓐ 500V ceramic disc capacitor is added across R66.

R69 is omitted.

R71 is increased from 2700Ω to 8200Ω.

An 8200Ω resistor in series with a 68mmf 2KV capacitor is added from pin 3 of V12 (Damper) to junction of R71 and terminal 6 of T5 (Horiz. Output).

R53 and R54 are electrically transposed.

A 680K resistor is added across R53.

T5 (Horiz. Output) is changed to Part #360700-2. With this change terminal 4 is not used, terminal 3 of Deflection Yoke is disconnected from terminal 4 and reconnected to terminal 5.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 387

EMERSON MODELS 1254, 1255, 1258, 1259, 1264, 1265, 1266, 1268, 1269, 2064, 2065 (Ch. 120341H, 120342R, 120347H, 120348R, 120358H, 120359R, 120384H)

Emerson Models 1254, 1255, 1258, 1259, 1264, 1265, 1268, 1269, 2064, 2065 (Ch. 120341H, 120342R, 120347H, 120348R, 120358H, 120359R) were covered in PHOTOFACT Folder 1 — Set 387.

Model 1266 (Ch. 120384H) is added, along with late production changes, in this Production Change Bulletin.

COMPONENT CHANGES

R84 is increased from 150K to 180K.

Chassis already incorporating this change are coded as follows: 120358H Ⓐ, 120359R (Initial Production).

TO REDUCE BLOOMING

R39 is increased from 150K to 220K.

Chassis already incorporating this change are coded as follows: 120358H Ⓑ, 120359R Ⓐ

TO REDUCE EFFECT OF STRAY PICKUP ON SYNC

A 10 Millihenry RF Choke is added between pin 5 of V14 (Damper) and pin 4 of V13.

C81 and the wire on pin 5 of V14 are disconnected and reconnected to pin 4 of V13.

R65 and the wire on pin 4 of V13 are disconnected and reconnected to pin 6 of V13.

A 47Ω $\frac{1}{2}$W resistor is added in place of the jumper wire located near V8 (Discriminator) on Video board, at junction of R45 and C55.

Chassis already incorporating these changes are coded as follows: 120358H Ⓒ, 120359R Ⓑ.

R100, 1Ω carbon resistor, is replaced by a 1Ω fuse ohm resistor (Part #397103) on all portable models.

PHOTOFACT* Folder
with CIRCUITRACE*

ACROSOUND MODEL
Ultra-Linear II

ACROSOUND MODEL
Ultra-Linear II

ACROSOUND MODEL
Ultra-Linear II

TRADE NAME	Acrosound Model Ultra-Linear II		
MANUFACTURER	Acro Products Co., 369 Shurs Lane, Philadelphia 28, Pa.		
TYPE SET	AC Operated 5 Tube Audio Amplifier		
POWER SUPPLY	110-125 Volts AC, 60 Cycles	RATING	150 Watts, 1.5 Amp. @ 117 Volts AC

ADJUSTMENTS

Set the Balance Output (R2) and the Driver Balance (R4) to the center of their ranges. Set the Bias (R3) one quarter turn from full counterclockwise rotation. Connect a DC VTVM to point (A) and chassis. Remove the GZ34 (V5) from its socket and turn the amplifier on. Adjust the Bias control for a reading of -36 volts. Replace the tube in its socket and allow it to warm up.

Connect a DC voltmeter between points (B) and (C). Adjust R2 until the meter reads zero (on the lowest scale). Disconnect the common lead of the meter and connect it to chassis. Readjust the Bias Control (R3) to obtain a meter reading of .34 volts. Recheck Balance Control setting by reconnecting the meter between points (B) and (C). When the Balance adjustments have been properly made the plates of the output tubes will normally show a dull red glow.

If it is desired to use KT-88 or 6550 tubes in the output, proceed as above with these exceptions: The initial setting of the Bias should be for 54 volts at point (A) and the final setting for .4 volts at points (B) and (C).

If an Intermodulation test set or a harmonic distortion instrument is not available, set the Driver Balance control (R4) at the center of its range. Intermodulation will then be approximately 1% at 60 watts.

If the test equipment is available, proceed as follows: Set the Damping control switch to "OFF" position. Connect a 16 ohm resistor across the 16 ohm output terminals. Feed in the test signal and adjust signal level to just below the maximum output power. For a 4:1 intermodulation test signal this will be about 24 volts, for sine wave input this will be about 29 volts. Adjust the Driver Balance (R4) for MINIMUM distortion. This will be approximately .4% for 60 watts output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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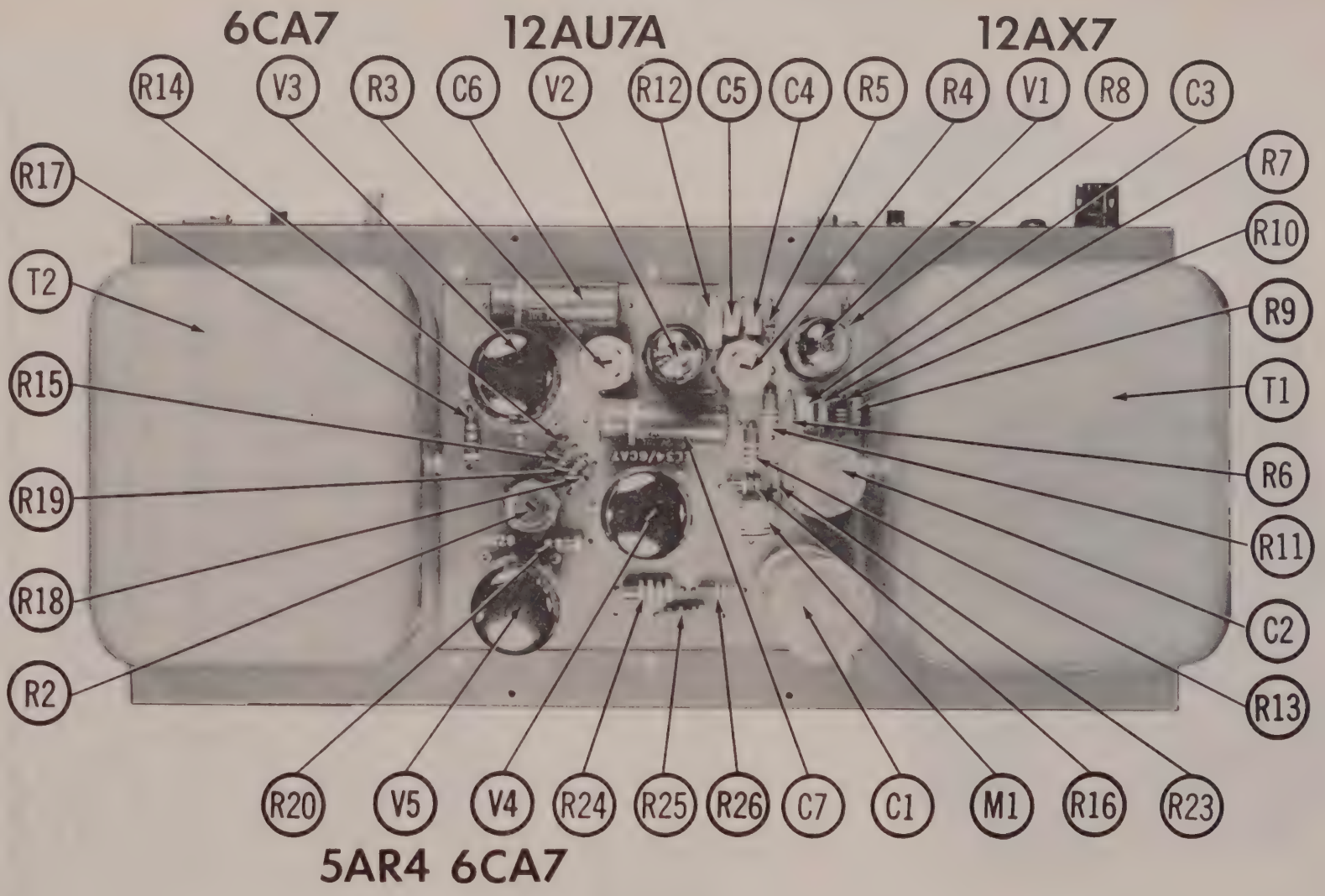


CHASSIS - TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. - Phase Inv.	12AX7	①
V2	Driver	12AU7A	②
V3	Output	EL34/6CA7	③
V4	Output	EL34/6CA7	③
V5	Rectifier	GZ34/5AR4	

① Some versions may use ECC83 in this application.
② Some versions may use ECC82 in this application.
③ Some versions may use KT88 or 6550 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ACROSOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■30	500						PCLS-4935 *	
B	▲20	500							
C	20	500							
D	▲10	350							
C2A	■20	150	①					PCLS-2415 *	
B	▲20	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① C2 is a common positive unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ACROSOUND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	100				SI 100	D6-101	L10T1	UC-531	5GA-T1	
C4	300				SI 300	D6-301	L10T3	UC-533	5GA-T3	
C5	300				SI 300	D6-301	L10T3	UC-533	5GA-T3	
C6	.15	600			P688N-15		CUB6P15	GEM6015	6TM-P15	
C7	.15	600			P688N-15		CUB6P15	GEM6015	6TM-P15	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ACROSOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2Ω	2(WW)		WW-020	A58-2			Damping
B	Shaft			Not Req.	RS-2			
R2	5000Ω	1(WW)						Output Balance
R3	5000Ω	1(WW)						Bias
R4	5000Ω	1(WW)						Driver Balance

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ACROSOUND PART No.	NOTES
R5	1meg			
R6	150K			
R7	180K			
R8	470Ω			
R9	180K			
R10	47K			
R11	47K	1		
R12	18K	1		
R13	47K	1		
R14	100K			
R15	4700Ω			

ITEM No.	RATING OHMS	RATING WATT	ACROSOUND PART No.	NOTES
R16	5600Ω	1		
R17	4.7Ω			
R18	100K			
R19	4700Ω			
R20	4.7Ω			
R21	.8Ω	5		
R22	470Ω			
R23	10K			
R24	47K	2		
R25	4700Ω	2		
R26	33K	1		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA ACROSOUND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② 1.5A SEC. 3 6.3VCT ② 3.7A	830VCT ② .160A Tap ② 100V ② .013A	5V ② 3A	TP-590 ①						

① Includes L1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.1	REPLACEMENT DATA ACROSOUND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5000Ω CT Screen Taps ② 1000Ω CT	16Ω Taps ② 8Ω, 4Ω SEC.2 .1Ω	TO-600							

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ACROSOUND PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.0128A		K1734 HA154 ①	RS050 SD-94 ①	50 K200 ①	① Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ACROSOUND PART No. FUSE	ACROSOUND PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	5A 250V			312005. (3AG 5A 250V)	342012	MTH5	HKP-CC

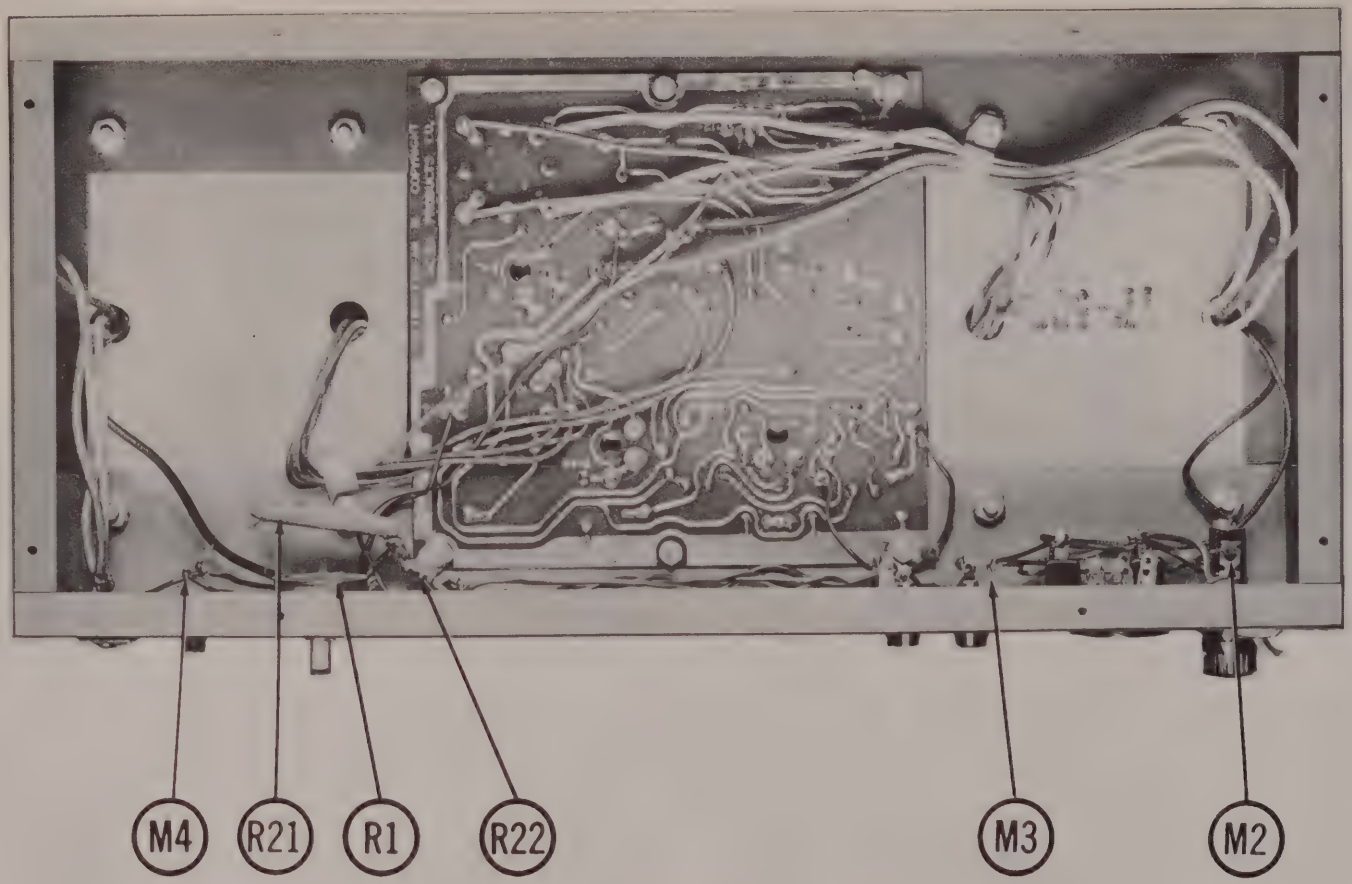
MISCELLANEOUS

ITEM No.	PART NAME	ACROSOUND PART No.	NOTES
M3	Switch		Power On-Off (DPST, Slide Type)
M4	Switch		Damping Factor On-Off (SPDT, Slide Type)

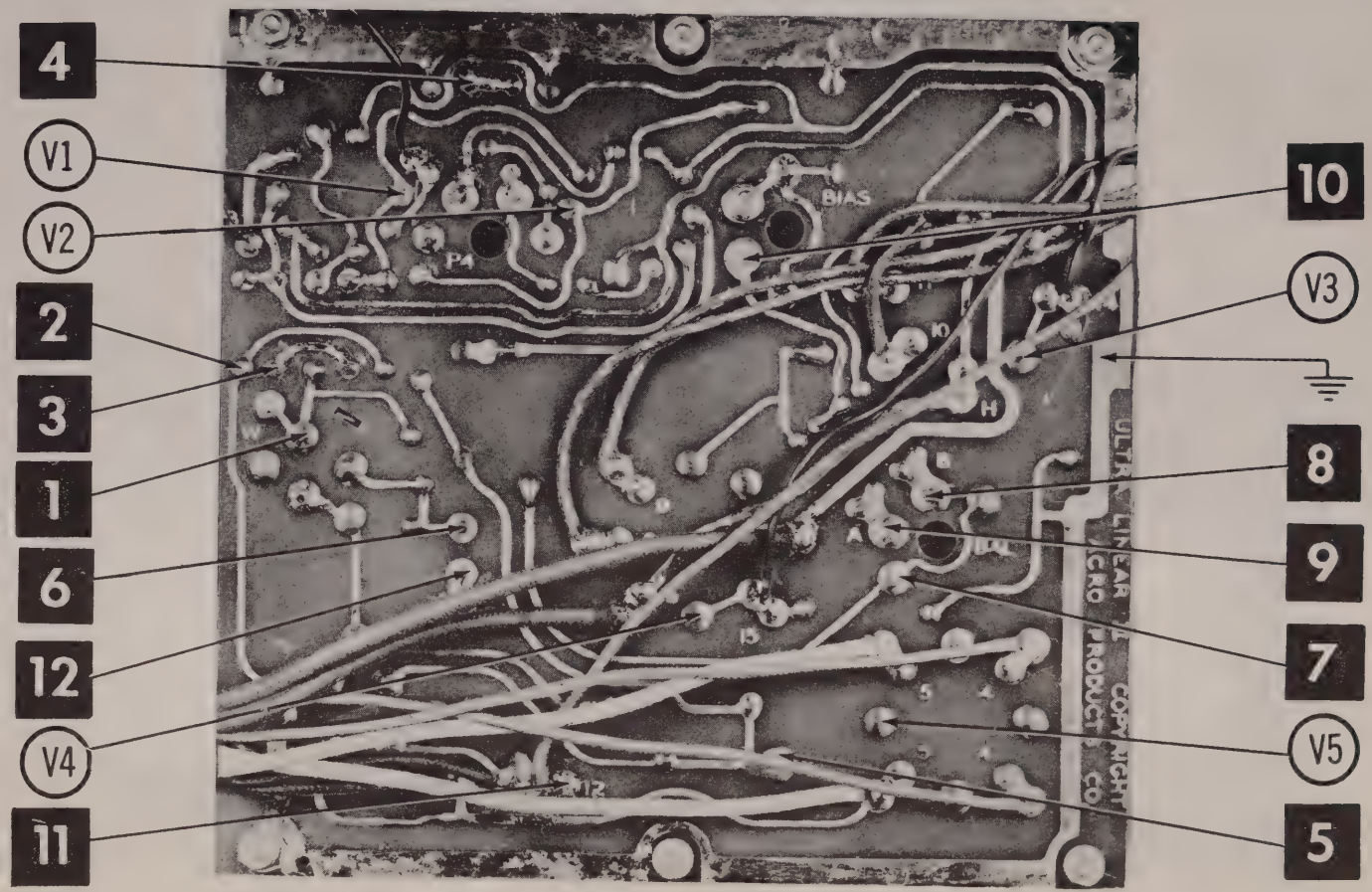
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



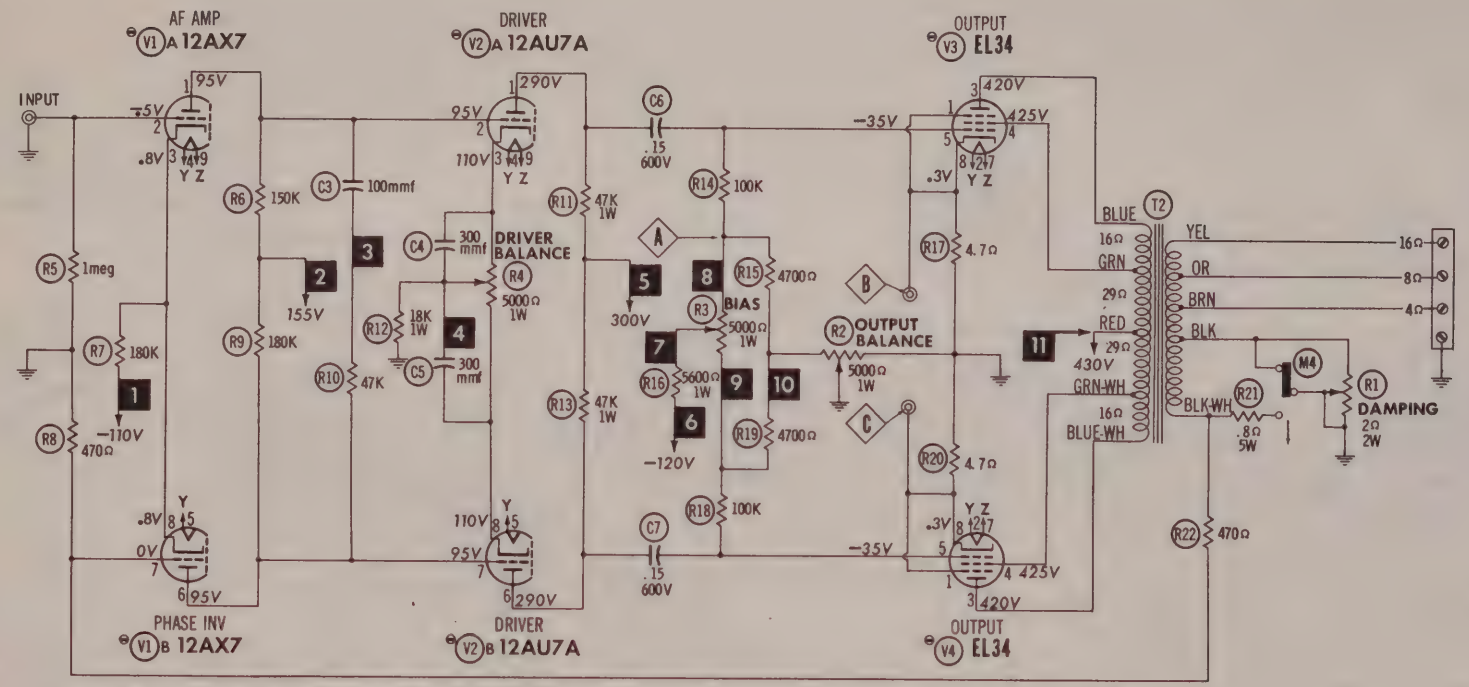
CHASSIS - BOTTOM VIEW



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

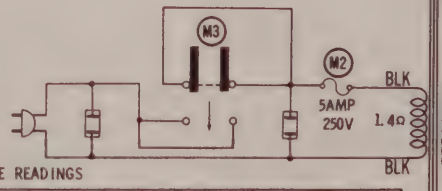
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Ⓖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

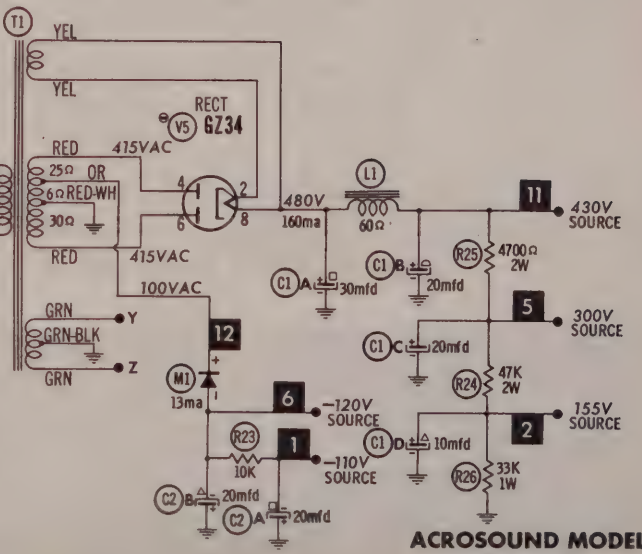


RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†200K	1meg	▪190K	.1Ω	.1Ω	†230K	230Ω	▪190K	.1Ω
V2	12AU7A	†50K	†200K	21K	.1Ω	.1Ω	†50K	†230K	21K	.1Ω
V3	EL34 6CA7	4.7Ω	.1Ω	†105Ω	†89Ω	105K	NC	.1Ω	4.7Ω	
V4	EL34 6CA7	4.7Ω	.1Ω	†105Ω	†89Ω	105K	NC	.1Ω	4.7Ω	
V5	GZ34 5AR4	NC	¶	NC	31Ω	NC	30Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

† MEASURED FROM PIN 8 OF V5.
▪ MEASURED FROM -120V. SOURCE.
NC NO CONNECTION



A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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ACROSOUND MODEL Ultra-Linear II

PHOTOFACT* Folder with CIRCUITRACE*

ARVIN MODEL
3582 (Ch. 1.44700)

ARVIN MODEL
3582 (Ch. 1.44700)

TRADE NAME	Arvin Model 3582 (Ch. 1.44700)
MANUFACTURER	Arvin Industries, Columbus, Indiana
TYPE SET	AC-DC Operated 7 Tube AM Receiver
POWER SUPPLY	110-120 Volts AC-DC
RATING	44 Watts, .41 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 - 1670KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 thru A4, A6, A9..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A7, A8..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1670KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	540KC	Tuning gang fully closed	"	A6	Adjust for maximum output. Repeat steps 2 and 3.
4.		"	1500KC	Tune to 1500KC signal		A7, A8	Adjust for maximum output.
5.		"	600KC	600KC	"	A9	Adjust for maximum output while rocking tuning gang.

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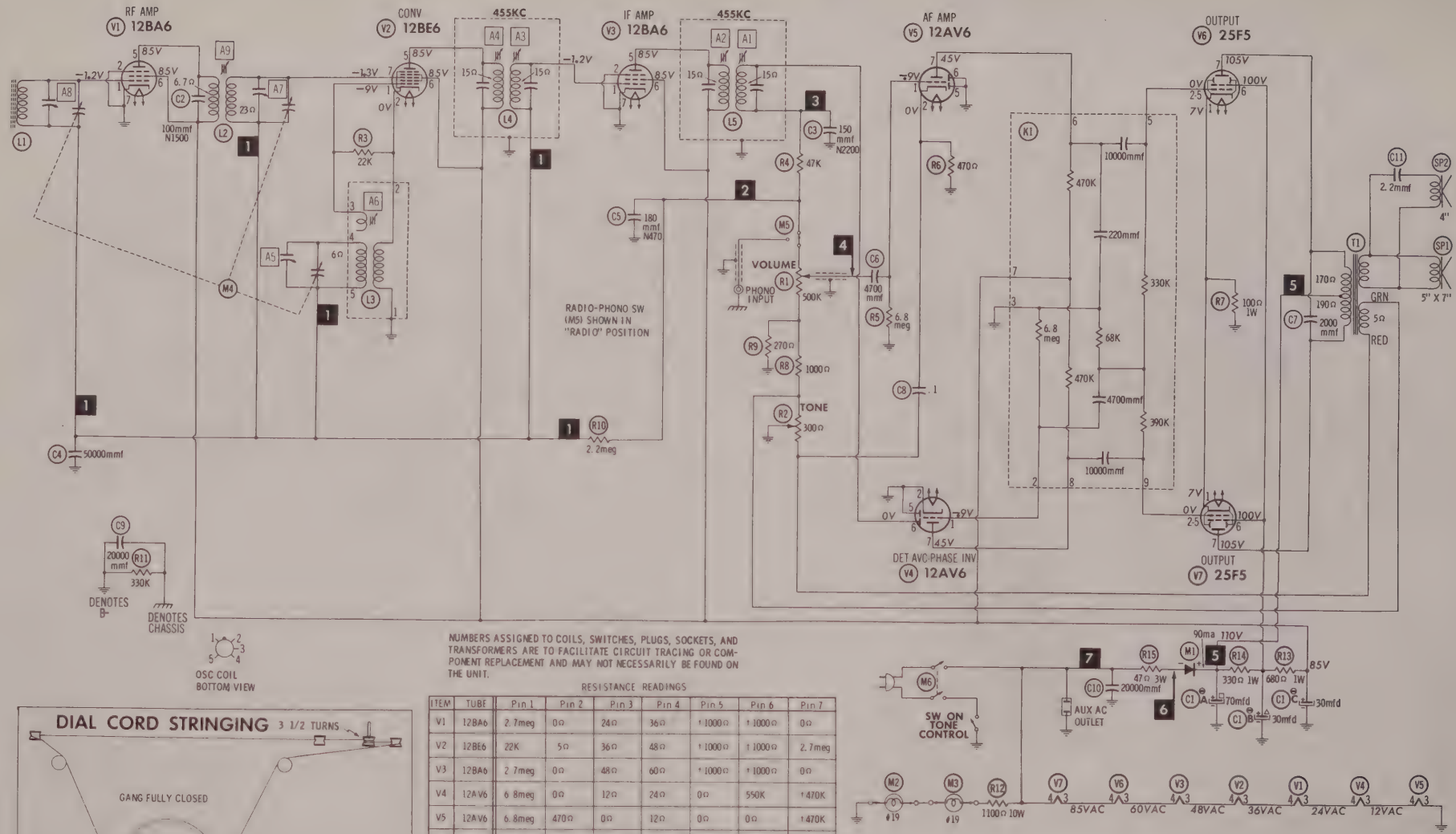
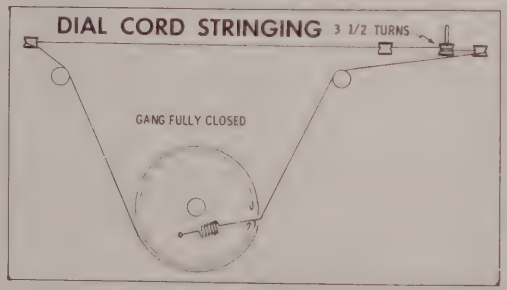
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J101

SET 444 FOLDER 5



DIAL CORD STRINGING 3 1/2 TURNS



A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.7meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	0Ω
V2	12BE6	22K	5Ω	36Ω	48Ω	†1000Ω	†1000Ω	2.7meg
V3	12BA6	2.7meg	0Ω	48Ω	60Ω	†1000Ω	†1000Ω	0Ω
V4	12AV6	6.8meg	0Ω	12Ω	24Ω	0Ω	550K	†470K
V5	12AV6	6.8meg	470Ω	0Ω	12Ω	0Ω	0Ω	†470K
V6	25F5	100Ω	400K	85Ω	110Ω	400K	†330Ω	†170Ω
V7	25F5	100Ω	460K	60Ω	85Ω	460K	†330Ω	†190Ω

† MEASURED FROM OUTPUT OF M1.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ARVIN MODEL 3582 (Ch. 1.44700)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. - AVC - Phase Inv.	12AV6	
V5	AF Amplifier	12AV6	
V6	Output	25F5	
V7	Output	25F5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■70	150	43711-5 ①		BBRT84215		TDLT-7	PCLS-3443.10*	
B	▲30	150							
C	30	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use 50-40-40mfd ② 150-150-150V.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	100		N1500							
C3	150		N2200							
C4	50000				BPD-05	DF-503	CUB6S5	GEM-615	5HK-S5	
C5	180		N470							
C6	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C7	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C8	.1	100			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C9	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C10	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C11	2.2									

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	44500-14	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	300Ω	½	44500-15	B-2	A43S-300	WPK300		Tone
B	Shaft			Not Req.	FS-3	Not Req.		
C	Switch			KR-1	Not Req.	76-11		

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ARVIN PART No.	NOTES
R3	22K			
R4	47K			
R5	6.8meg			
R6	470Ω			
R7	100Ω	1		
R8	1000Ω			
R9	270Ω			
R10	2.2meg			
R11	330K			
R12	1100Ω	10	44448-5	
R13	689Ω	1		
R14	330Ω	1		
R15	47Ω	3	45237	Fuse Type

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Audio Coupling Net	220mmf, 4700mmf, 10000mmf, 10000mmf, 6.8meg, 68K, 330K, 390K, 470K, 470K	46203	

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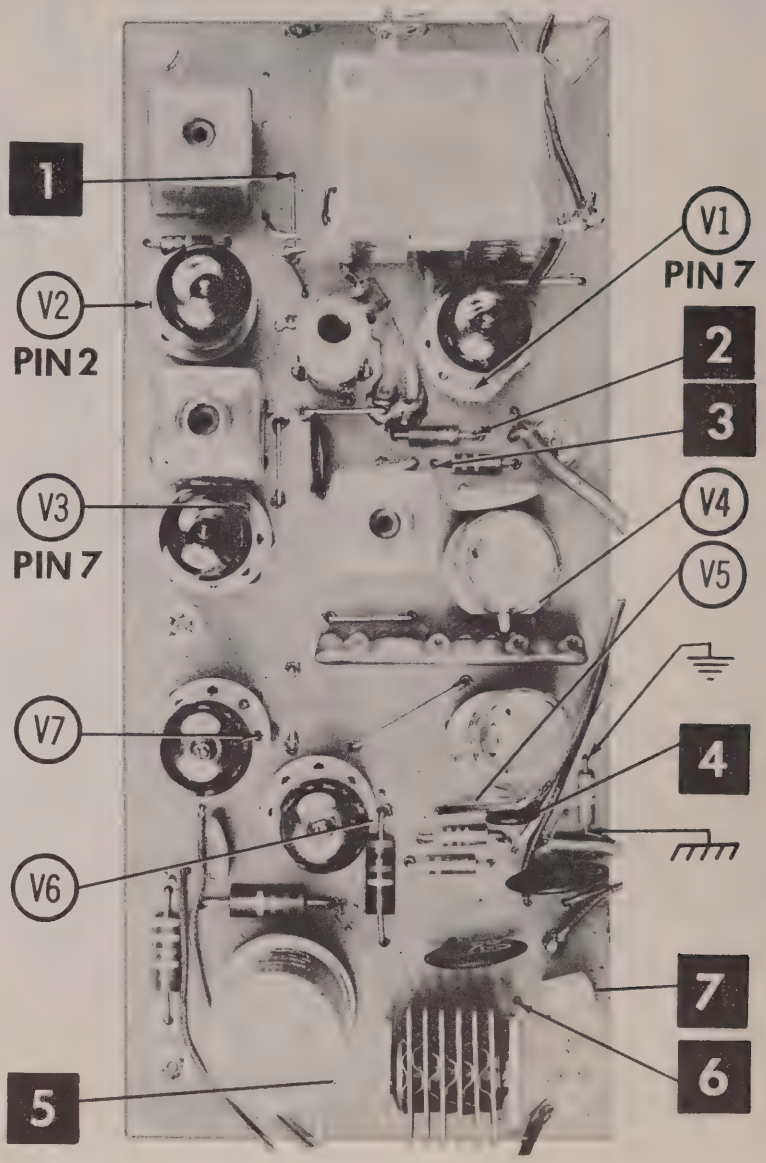
ARROWS INDICATING TUBE LOCA
POINTING TO PIN 1 UNLESS OTHERWISE I



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ARVIN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	45534-11					
L2	RF Trans.	43829-1					
L3	Osc. Coil	43644-6					
L4	Input IF	44282-1	16-6780	BC-356	13-PC9	RF-4	
L5	Output IF	44282-1	16-6780	BC-357	13-PC10	RF-4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.1	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3600Ω CT	250Ω SEC. 2 6-8Ω	46415-1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	QUAM PART No.	
SP1	5" x 7"	PM	6-8Ω	46130	57A2IZ6. 3	
SP2	4"	PM	6-8Ω	46129	4AITZ6. 7	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	ARVIN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.090A	44465-3	1235AH HA154 ①	T100 SD-94 ①	100AS K200 ①	① Silicon Type

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M2	Lamp	46199	#19
M3	Lamp	46199	#19
M4	Tuning Cap.	46198	3 Gang, Ant. 5-235mmf, RF 5-235mmf, Osc. 5-83mmf
M5	Switch	46069-1	Phono-Radio (Rotary Wafer Type)
M6	Switch	46209-2	Interlock, Includes Bracket Assembly, DPDT

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

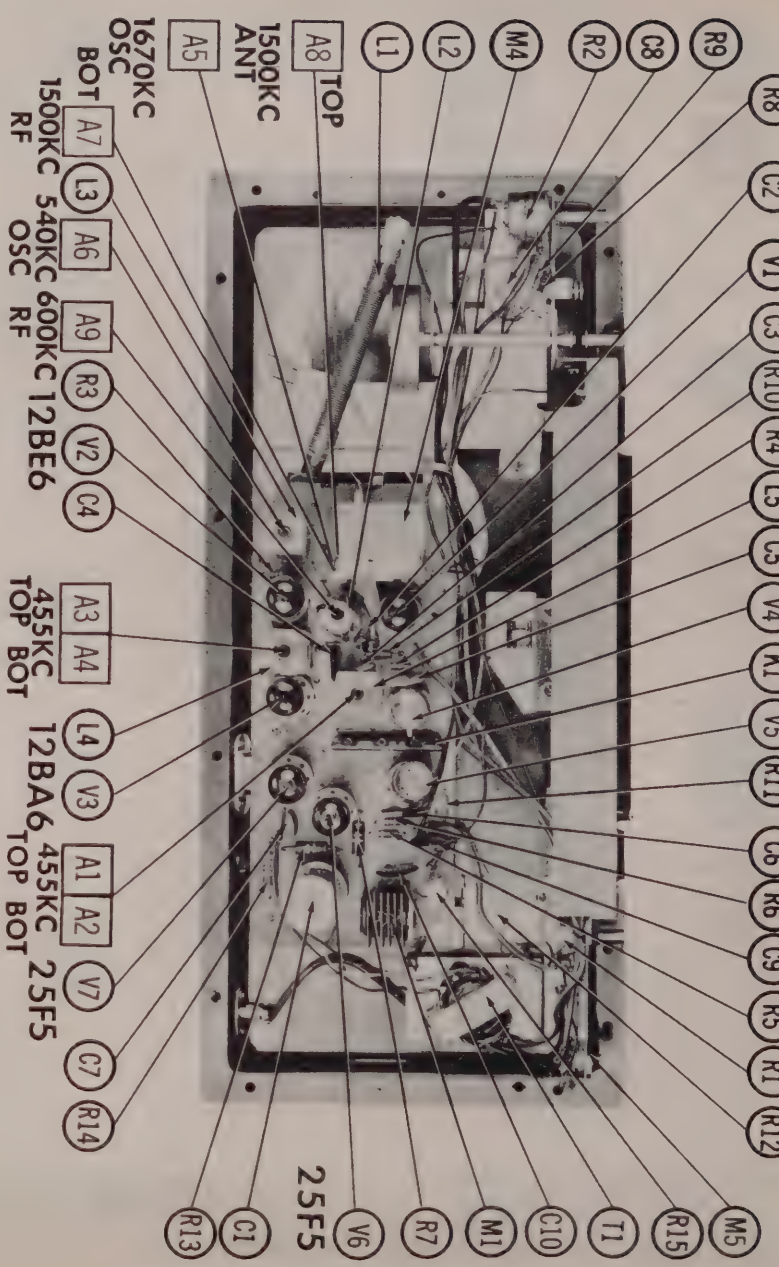
NAME	PART NO.	DESCRIPTION
Knob	45891-29	Control, 4 used
Cabinet	46478-77	Base, White
Cabinet	45842-69	Top, Gray
Cabinet	46478-29	Base, Black
Cabinet	45842-29	Top, Black
Pointer	46111-1	
Dial Scale	45977-1	
Dial Crystal	45733	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—TOP VIEW



PHOTOFACT* Folder

EIA MEMBER

FISHER MODEL 30C

FISHER MODEL 30C

FISHER MODEL 30C

TRADE NAME	Fisher Model 30C
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated Preamplifier
POWER SUPPLY	105 - 125 Volts AC, 50-60 Cycles RATING 11 Watts, .09 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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J27

DATE 6-59 SET 444 FOLDER 6

SET 444 FOLDER 6

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1 V2	Preamplifier Preamp. -Cath. Follower	EF86/6267 12AT7	①

ITEM No.	USE	TYPE	NOTES
V3	AF Amplifier	ECC83/ 12AX7	①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲40	300	C670-125	AFH4-02	D0020	FP327.89	TMD-31 TD-40-250	TVLS-3561.4*	
B	■40	250							
C	▲40	250							
C2	25	6	C639-144	SRE6V25	BBR25-6	TT6X25	ML30-6	TE-1091	
C3	25	6	C639-144	SRE6V25	BBR25-6	TT6X25	ML30-6	TE-1091	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	100	1000	N1500 10%	C50070-6						
C5	.047	250		C50074-27	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	.047	250		C50074-27	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	.01	250		C50074-25	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C8	.0033	250		C50074-23	P488N-0033	D6-332	CUB6D33	GEM-6233	6TM-D33	
C9	.0047	1000		C50074-24	P1088N-0047	DD-472	CUB10D47	GEM-16247	10TM-D47	
C10	20000			C50089-4	BPD-02	DD-203	BYB682	B-120	5GA-S2	
C11	.47	250		C50074-29	P488N-47		CUB4P47	GEM-4047	4TM-P47	
C12	.068	250		C50074-30	P488N-068		CUB4S68	GEM-4168	4TM-S68	
C13	.022	250		C50074-26	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C14	.047	250		C50074-27	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	.1	250		C50074-28	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C16	.01	250		C50074-25	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C17	.047	250		C50074-27	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C18	82	1000	N1500 10%	C50070-7						
C19	.1	250		C50074-28	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	100K	⅓	R694-120					Volume, Taps ⓐ 40K, 80K
B	250K	⅓						Volume
R2A	1meg	½	R694-119	B-69	A47-1meg-S	Q11-137	U54	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	500K	½	R694-118	BT-64	A47F5-500K	Q19-133X	UT431	Treble, Tap ⓐ 250K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	U S-26	
R4	250K	1/10	R657-134	JP-254	48M-250K-S			Level Set, Aux. 1.
R5	250K	1/10	R657-134	JP-254	48M-250K-S			Level Set, Low Level
R6	500Ω	1 ww	R516-128					Hum Adjust

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		FISHER PART No.	NOTES
	OHMS	WATT		
R7	2. 2meg		RC20BF225K	
R8	470K		RC20BF474K	
R9	100K		RC20BF104K	
R10	10K		RC20BF103K	
R11	220K	1	RC30BF224K	
R12	220K		RC20BF224K	
R13	470Ω	1	RC30BF471K	

ITEM No.	RATING		FISHER PART No.	NOTES
	OHMS	WATT		
R14	10meg		RC20BF106K	
R15	220K		RC20BF224K	
R16	33K		RC20BF333K	
R17	15K		RC20BF153K	
R18	270K		RC20BF274K	
R19	33K		RC20BF333K	
R20	470K		RC20BF474K	

CHASSIS—TOP VIEW

PARTS LIST & DESCRIPTION (continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	FISHER PART No.	NOTES
R21	4700Ω		RC20BF472K	
R22	1200Ω		RC20BF122K	
R23	47K		RC20BF473K	
R24	15K		RC20BF153K	
R25	10K		RC20BF103K	
R26	22K		RC20BF223K	
R27	8200Ω		RC20BF822K	
R28	100K		RC20BF104K	

ITEM No.	RATING OHMS	RATING WATT	FISHER PART No.	NOTES
R29	1200Ω		RC20BF122K	
R30	1meg		RC20BF105K	
R31	330K		RC20BF334K	
R32	82K		RC20BF823K	
R33	4.7meg		RC20BF475K	
R34	1000Ω		RC20BF102K	
R35	4700Ω		RC20BF472K	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	FISHER PART No.	REPLACEMENT DATA
K1	Tone Comp.		PC522-105	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .09A	420VCT ⓐ .0065A	6.3V ⓐ .9A	T-694-115						

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	FISHER PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.0065A	SR-50113①			SD-94 ② ③	026-20C1Q① F6 ② ③	① Selenium Type ② Silicon Type ③ 4 Used (2 Used in series on each side as a full wave rectifier)

FUSES

ITEM No.	TYPE	RATING	FISHER PART No. FUSE	FISHER PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	½A 250V	F3297	X1036	312.500 (½A 250V)	342012	AGC ½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES
M3	Switch	S694-122	Input Selector, 6 Position (Rotary Wafer Type)
M4	Switch	S694-121	Rumble Filter-Loudness Contour, 5 Position (Rotary Wafer Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

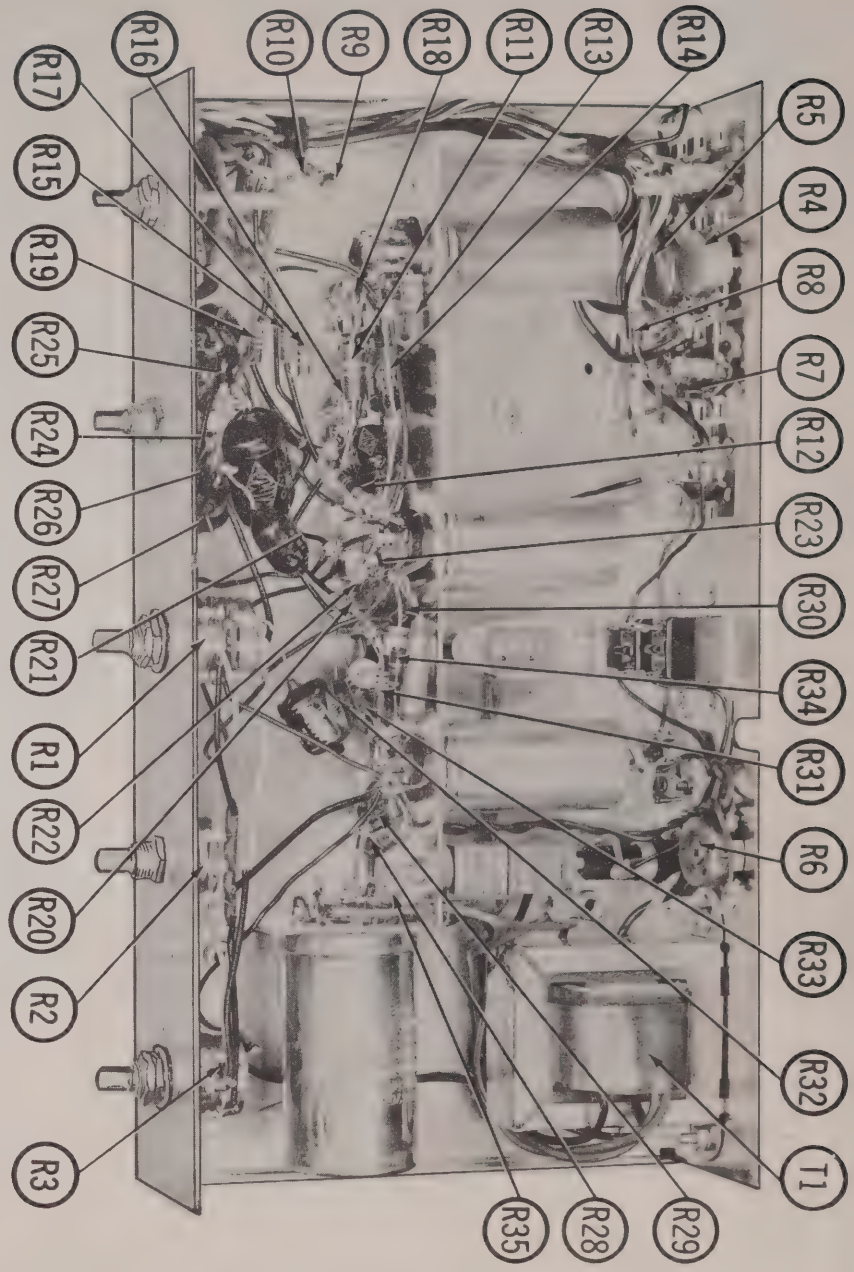
NAME	PART NO.	DESCRIPTION
Knob	E50049-12	5 Used

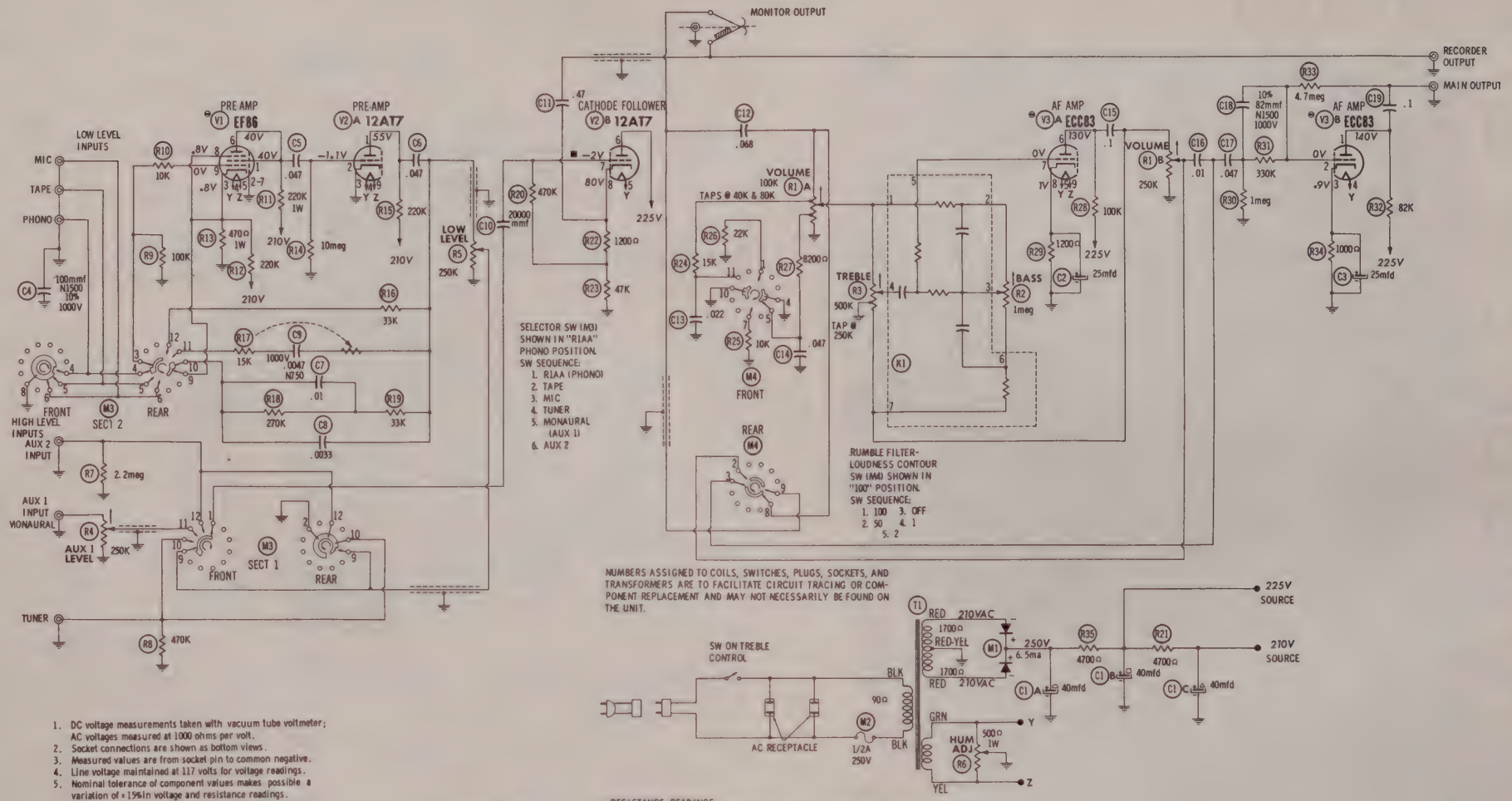
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—TOP VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF86 6267	†230K	0Ω	470Ω	4Ω	4Ω	†230K	0Ω	470Ω	110K
V2	12AT7	†230K	10meg	0Ω	4Ω	4Ω	†4700Ω	520K	48K	110K
V3	ECC83 12AX7	†87K	1.3meg	1000Ω	4Ω	4Ω	†105K	300K	1200Ω	4Ω

† MEASURED FROM OUTPUT OF M1
▪ MEASURED FROM PIN 8 OF V2

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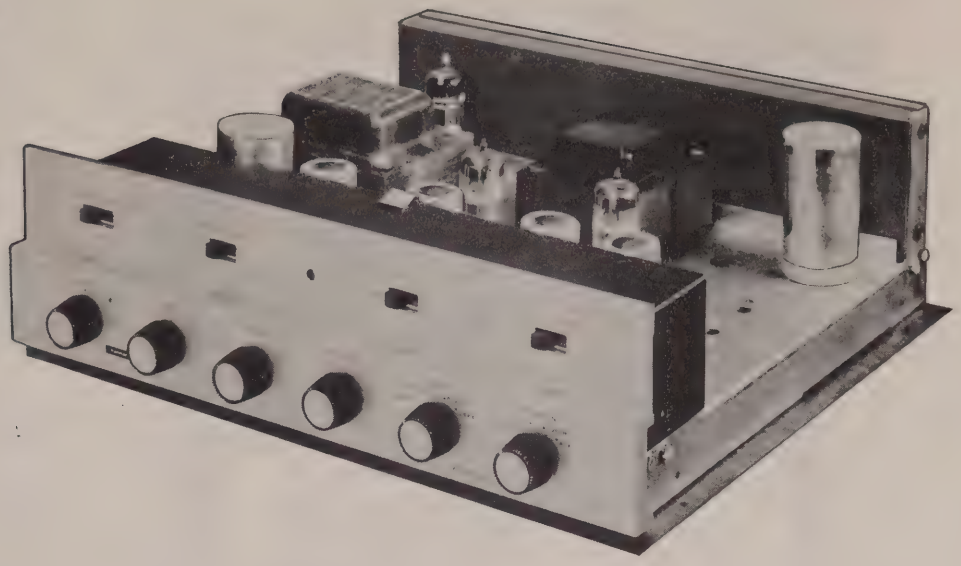
FISHER MODEL 30C

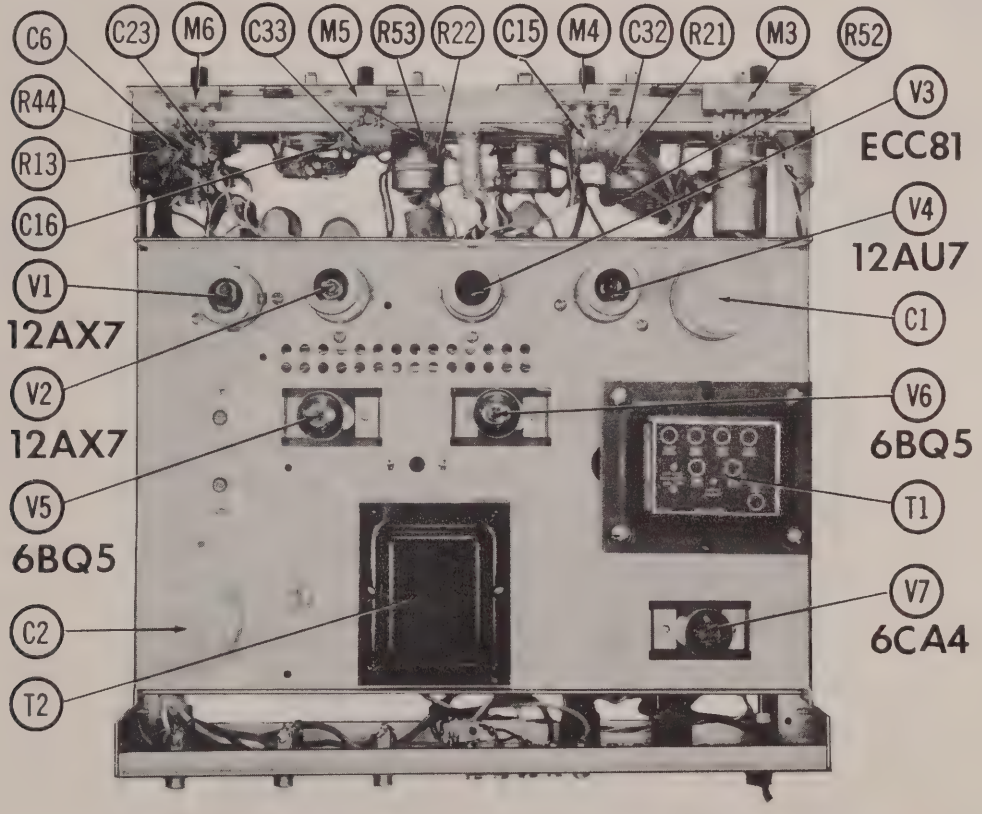
PHOTOFACT* Folder

HARMAN-KARDON
MODEL AX-20

HARMAN-KARDON
MODEL AX-20



TRADE NAME	Harman-Kardon Model AX-20 (The Nocturne)
MANUFACTURER	Harman-Kardon, Inc., 520 Main St., Westbury, Long Island. N. Y.
TYPE SET	AC Operated 7 Tube Audio Amplifier
POWER SUPPLY	105-125 Volts AC, 60 Cycles RATING 77 Watts, . 77 Amp. @ 117 Volts AC



HARMAN-KARDON
MODEL AX-20

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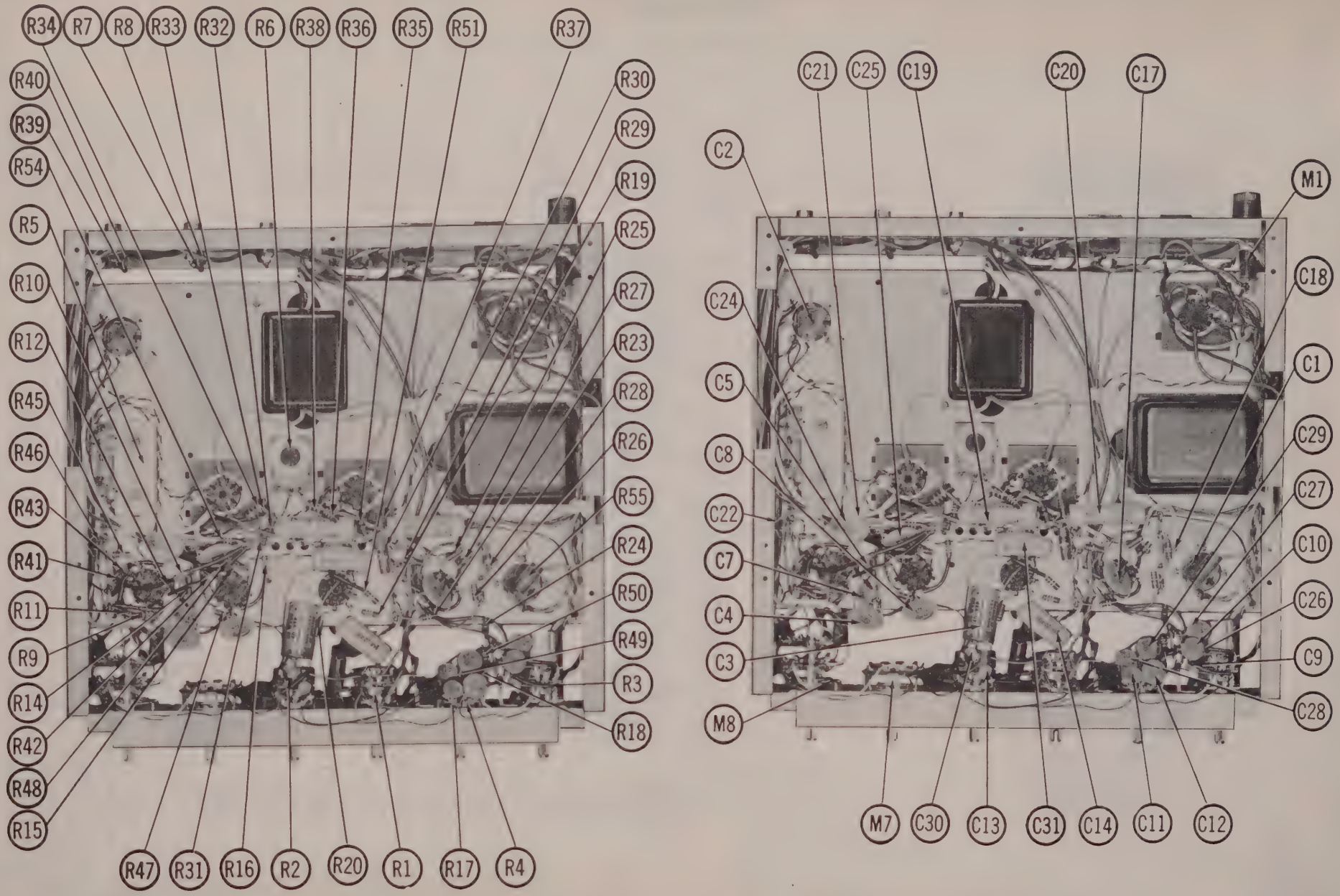


CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Right Channel Tape & Phono Preamplifier - Left Channel Tape & Phono Preamplifier	ECC83/12AX7
V2	Right Channel Tape & Phono Preamplifier - Left Channel Tape & Phono Preamplifier	ECC83/12AX7
V3	Right Channel AF Amp. - Left Channel AF Amp.	12AT7/ECC81
V4	Right Channel AF Amp. - Right Channel Phase Inv.	ECC82/12AU7
V5	Right Channel Output	EL84/6BQ5
V6	Right Channel Output	EL84/6BQ5
V7	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲40	450	JE2202842			FP176		TVLS-2738 *	
B	▲50	350				TC79			
C2A	40	300	JE2202974	AFH3-111	C0870	FP217. 87	TMD-58	TVL-3636. 5	
B	▲40	300				TC2501	TD-100-25		
C	▲100	25							
C3	50	25	JE2362786	PRS25V50	BBR50-25	TC29	TD-50-25	TVA-1206	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C5	200		10%			D6-201	L10T2		5GA-T2S 10% *	
C6	150		10%		DI-150	DD-151	L10T15	CNO-315	5GA-T15S 10% *	
C7	1500		10%		DI-1500			JL-215	5GA-D15S 10% *	
C8	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C9	750		10%		DI-750			JL-375	5GA-T75S 10% *	①
C10	3900		10%					JL-239	5GA-D39S 10% *	① ②
C11	3000		10%		DI-3000				5GA-D3S 10% *	①
C12	15000		10%						5HK-S15S 10% *	①
C13	47		N5600							
C14	. 22	400			P488N-22		CUB4P22	GEM-4022	4TM-P22	
C15	. 03	400			P488N-03	DF-303	CUB6S3	GEM-413	4TM-S3	
C16	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C17	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C18	100		10%		DI-100	DD-101	L10T1	CNO-310	5GA-T1S 10% *	
C19	. 05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C20	. 05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C21	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C22	200		10%			D6-201	L10T2		5GA-T2S 10% *	
C23	150		10%		DI-150	DD-151	L10T15	CNO-315	5GA-T15S 10% *	
C24	1500		10%		DI-1500			JL-215	5GA-D15S 10% *	
C25	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C26	750		10%		DI-750			JL-375	5GA-T75S 10% *	①
C27	3900		10%					JL-239	5GA-D39S 10% *	① ②
C28	3000		10%		DI-3000				5GA-D3S 10% *	①
C29	15000								5HK-S15S 10% *	①
C30	47		N5600							
C31	. 22	400			P488N-22		CUB4P22	GEM-4022	4TM-P22	
C32	. 03	400			P488N-03	DF-303	CUB6S3	GEM-413	4TM-S3	
C33	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

① Some versions may include this part in Component Combination (Part #PC2492902).
② Some versions may use a 3400mmf in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	50K	½	RV2202846					Loudness, Right Channel Tap ⓐ 25K
B	50K	½						Loudness, Left Channel Tap ⓐ 25K
R2A	500K	½	RV2202847	B-59		Q11-133		Balance, Right Chan. Note 1
B	500K	½		SR-59		M11-133	† UE1295	Balance, Left Chan. Note 1
R3A	500K	½	RV2493019	B-58	AD47-500K-Z	Q13-133		Treble, Right Chan. Note 2
B	500K	½		SR-58	Not Req.	M13-133		Treble, Left Chan. Note 2
C	Shaft			Not Req.	KSS-3	Not Req.	†† UE1403-S	
D	Switch			KR-1	SWE-12	76-1		
R4A	500K	½	RV2362697	BB-104	AD47-500K-Z	Q13-133		Bass, Right Channel
B	500K	½		Not Req.	Not Req.	M13-133	♣	Bass, Left Channel
C	Shaft			Not Req.	KSS-3	Not Req.		
R5A	100Ω	½	RV2362690				U1	Hum Adjust, Low Level
B	100Ω	½					U1	Hum Adjust, High Level
R6	100Ω	½	RVCOM2569	B-1			U1	Output Balance

Note 1. Alternate Part #RV2362696 may be used in some versions.
Note 2. Alternate Part #RV2362730 or RV2363019 may be used in some versions.
† "STA-LOC" Equivalent: FA55L, RU55L, CS3500.
†† "STA-LOC" Equivalent: FA55A, RU55A, CS3500, US41
♣ "STA-LOC" Equivalent: FA55A, RU55A, CS3500

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Harman-Kardon PART No.	NOTES
	OHMS	WATT		
R7	100K			
R8	470K			
R9	47K			Note 1
R10	120K			
R11	1500Ω			
R12	150K			
R13	47K			
R14	220K			
R15	3. 3meg			
R16	120K			
R17	120K			Note 2
R18	27K			Note 2
R19	68K			
R20	330Ω			
R21	27K			
R22	6800Ω			
R23	68K			
R24	1000Ω			
R25	1meg			
R26	22K			
R27	1000Ω			
R28	22K			
R29	22K			
R30	10K	1		
R31	1000Ω			

ITEM No.	RATING		Harman-Kardon PART No.	NOTES
	OHMS	WATT		
R32	470K			
R33	220Ω			
R34	270Ω	1		
R35	1000Ω			
R36	470K			
R37	220Ω			
R38	270Ω	1		
R39	470K			
R40	100K			
R41	47K			Note 1
R42	120K			
R43	1500Ω			
R44	47K			
R45	150K			
R46	220K			
R47	3. 3meg			
R48	120K			
R49	120K			Note 2
R50	27K			Note 2
R51	68K			
R52	27K			
R53	6800Ω			
R54	27K			
R55	2200Ω	2		

Note 1. Some versions may use 100K in this application.
Note 2. Some versions may include this part in Component Combination (Part #PC2492902).

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .77A	660VCT ⓐ .100A	6. 3V ⓐ 1.1A	FT2202784						
	SEC. 3	SEC. 4	SEC. 5							
	6. 3V ⓐ 2.7A									

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7000Ω CT	16Ω Tap ② 8Ω	FT2202785	Z1405 ①			A-3304 ①	22S68 ①	S-31A ①	① Use original shields.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Harman-Kardon PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1½A 250V			3120L.5 (3AG 1½A 250V)	342012	AGC1½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M2	Lamp		#1847
M3	Switch	ES1021717	Speaker Selector, DPDT (Slide Type)
M4	Switch	ESCOM2727	Rumble Filter On-Off, DPDT (Slide Type)
M5	Switch	ESCOM2727	Contour On-Off, DPDT (Slide Type)
M6	Switch	ESCOM2727	Equalization EUR, 7½-RIAA, 3 3/4, DPDT (Slide Type)
M7	Switch	ER2362700	Mode, 4 Position (Rotary Wafer Type)
M8	Switch	ER2202789	Function, 4 Position (Rotary Wafer Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	PCOM2865	With White Line, 6 used

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

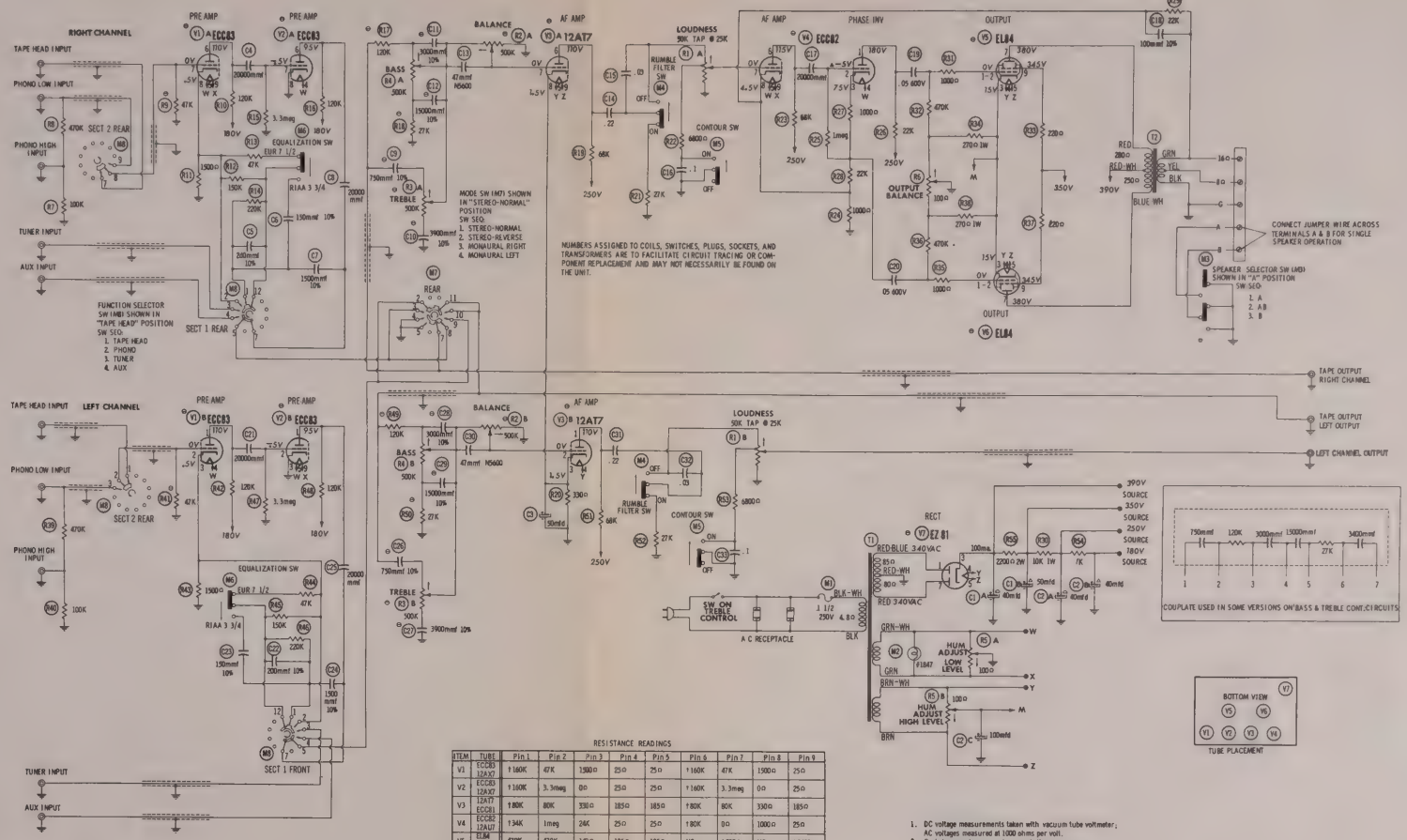
ADJUSTMENTS

OUTPUT BALANCE ADJUSTMENT (R6)

Turn the Loudness control fully counterclockwise. While listening to the speaker, adjust Output Balance for MINIMUM hum.

HUM ADJUSTMENT (R5A, R5B)

Set the Function switch to Tuner. With no signal at the input turn Loudness control fully clockwise; adjust the High Level hum control for MINIMUM hum. Turn Function switch to Tape-Lo position and adjust Low Level hum control for MINIMUM hum.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	↑160K	47K	1500Ω	25Ω	25Ω	↑160K	47K	1500Ω	25Ω
V2	ECC83 12AX7	↑160K	3.3meg	0Ω	25Ω	25Ω	↑160K	3.3meg	0Ω	25Ω
V3	12AT7 ECC81	↑80K	80K	330Ω	185Ω	185Ω	↑80K	80K	330Ω	185Ω
V4	ECC82 12AU7	↑34K	1meg	24K	25Ω	25Ω	↑80K	0Ω	1000Ω	25Ω
V5	EL84 6BQ5	470K	470K	140Ω	185Ω	185Ω	NC	↑280Ω	NC	↑2400Ω
V6	EL84 6BQ5	470K	470K	140Ω	185Ω	185Ω	NC	↑250Ω	NC	↑2400Ω
V7	EZ81 6CA4	85Ω	NC	¶	185Ω	185Ω	NC	80Ω	NC	TP

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
↑ MEASURED FROM PIN 3 OF V7.
* MEASURED FROM PIN 3 OF V4.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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HARMAN-KARDON
MODEL AX-20

PHOTOFACT* Folder

EIA

LAFAYETTE
MODEL LA-90

LAFAYETTE
MODEL LA-90

LAFAYETTE
MODEL LA-90

TRADE NAME	Lafayette Model LA-90		
SUPPLIER	Lafayette Radio, 169-08 Liberty Ave., Jamaica 33, New York		
TYPE SET	AC Operated 10 Tube Stereo Amplifier		
POWER SUPPLY	105-125 Volts AC, 60 Cycles	RATING	115 Watts, 1.1 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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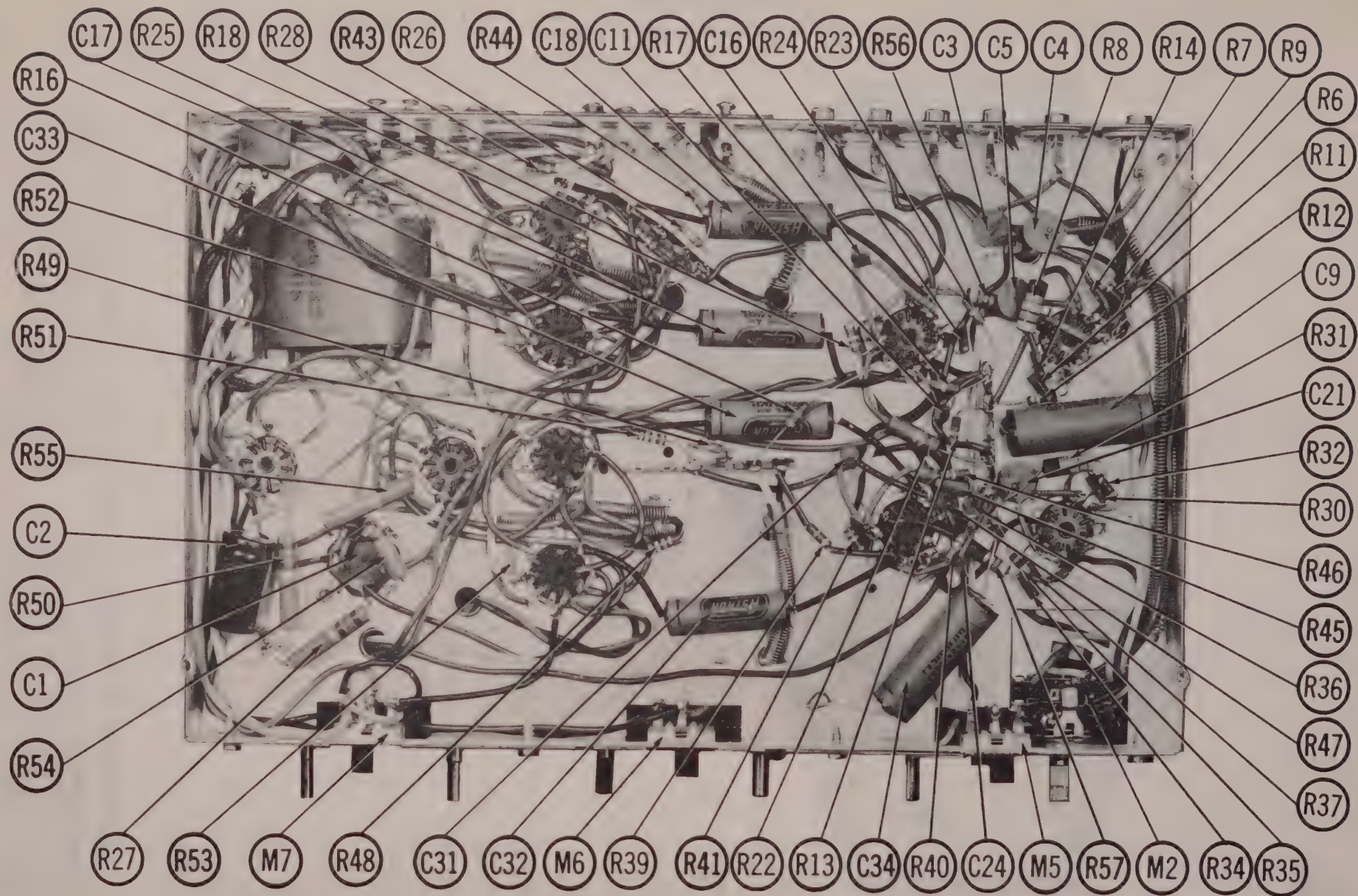


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel "A" Preamplifier	12AX7	
V2	Channel "A" AF Amp. - Phase Inverter	12AX7	
V3	Channel "A" Output	EL84/6BQ5	①
V4	Channel "A" Output	EL84/6BQ5	①
V5	Channel "B" Preamplifier	12AX7	
V6	Channel "B" AF Amp. - Phase Inverter	12AX7	
V7	Channel "B" Output	EL84/6BQ5	①
V8	Channel "B" Output	EL84/6BQ5	①
V9	Rectifier	EZ80/6V4	①
V10	Rectifier	EZ80/6V4	①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA LAFAYETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	●20	350		AFHS4-56-05	D0430	FP420.47	TMT-39	TVL-4628.3	
B	■40	350			BBR100-25		TD-100-25		
C	▲40	350							
D	100	25		PRS25V100	BBR100-25	TC2501	TD-100-25	TVA-1207	
C2	100	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

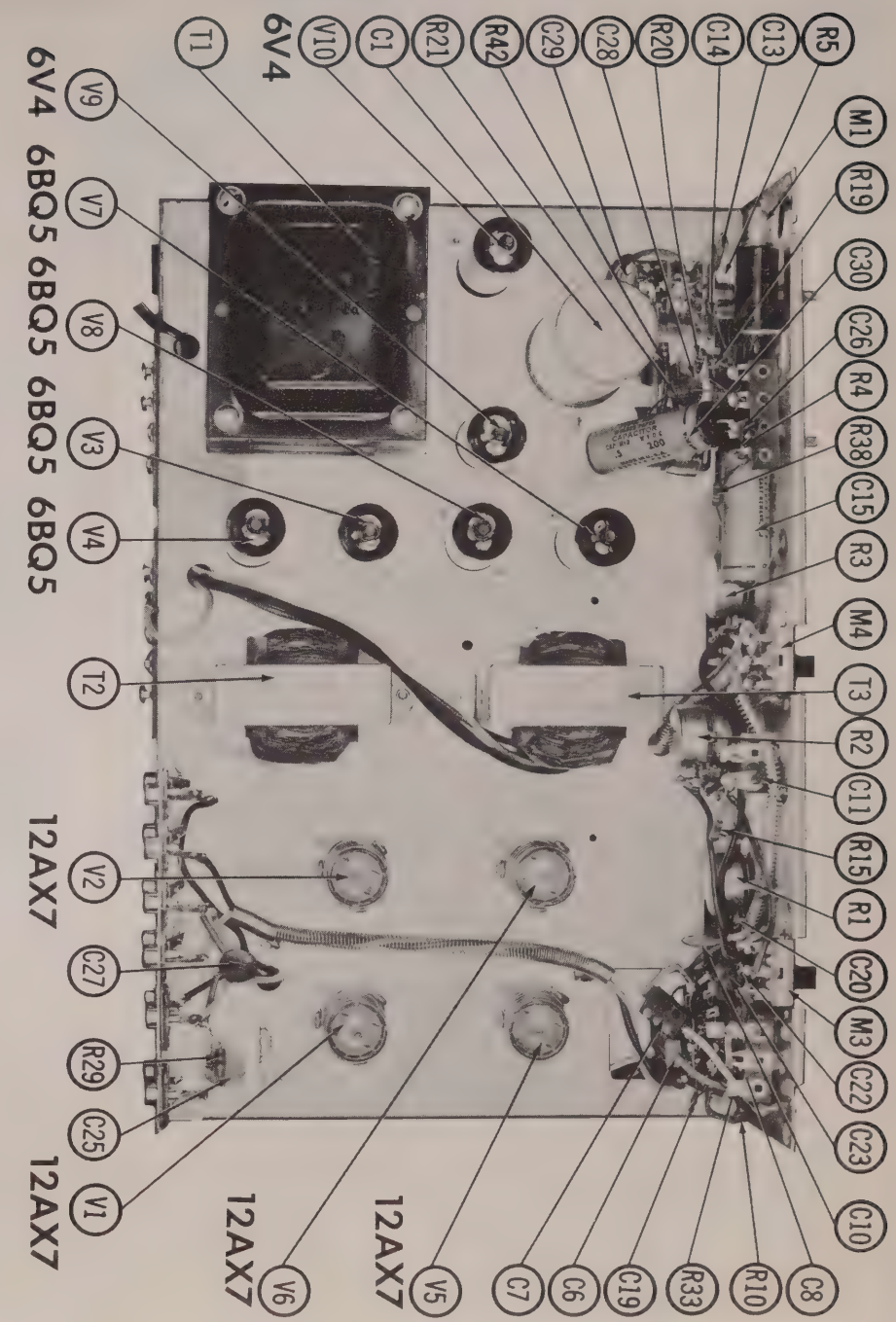
ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA LAFAYETTE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	120		N750		N750-SI 120	TCN-120	C10T12U	CN7-312	5TCU-T12S *	
C4	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C5	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C6	20		10%		1469-00002		22R5Q2		MS-42	①②
C7	390		10%		1469-00039		5R5T39	MCB243	MS-339	①②
C8	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C9	.25	400			P488N-25		CUB4P25	GEM-4025	4TM-P25	
C10	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C11	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C12	100				BPD-0001	DD-101	L10T1	B-310	5GA-T1	
C13	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C14	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C15	.5	200			P288N-5		CUB2P5	GEM-205	2TM-P5	
C16	220				BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C17	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C18	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C19	100		N750		N750-DI 100	DTN-100	C10T1U	CN7-310	5TCU-T1	③
C20	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C21	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C22	20		10%		1469-00002		22R5Q2		MS-42	①②
C23	390		10%		1469-00039		5R5T39	MCB243	MS-339	①②
C24	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C25	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C26	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C27	100				BPD-0001	DD-101	L10T1	B-310	5GA-T1	
C28	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C29	20000				BPD-02	DD-203	BYB6S2	B-120	5GA-S2	
C30	.5	200			P288N-5		CUB4P5	GEM-205	2TM-P5	
C31	220				BPD-00022	DD-221	L10T22	B-221	5GA-T22	
C32	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C33	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C34	.25	400			P488N-25		CUB4P25	GEM-4025	4TM-P25	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use 820mmf in this application.
② Some versions may use 1600mmf in this application.
③ Some versions may use 120mmf in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA LAFAYETTE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	V-318-4	BT-7417	A47F-1meg	Q13-137X	UT-440	Balance, Channel A Tap ② 200K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS (cont)

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LAFAYETTE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R2A	1meg	½	V-319-2	BB-107	AD47-1meg-Z	Q13-137		Level, Channel A
B	1meg	½		Not Req.	Not Req.	M13-137		Level, Channel B
C	Shaft			Not Req.	FS-3	Not Req.		
R3A	1meg	½	V-318-4	BT-7417	A47F-1meg	Q13-137X	UT-440	Balance, Channel B
								Tap ② 200K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	25K	½	V-320-1					Treble, Channel A
B	25K	½						Treble, Channel B
R5A	250K	½	V-320-2	F1-35		† QJ982	■	Bass, Channel A
B	250K	½		R2-35				Bass, Channel B

† "Concentrikit" Equivalent: K-6 Kit, Base elements and shafts; B13-130, P17-105 (Panel). B13-130, R1-122 (Rear). (Not available as a factory assembled unit).

■ "STA-LOC" Equivalent: FA254A, OF1062, RU254A, IS1625

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		LAFAYETTE PART No.	NOTES
	OHMS	WATT		
R6	10K			
R7	100K			
R8	470K	1		Note 1
R9	820Ω			Note 2
R10	220K			Note 1
R11	1meg			Note 1
R12	300K			Note 1
R13	270K			
R14	1500Ω			
R15	68K			
R16	47K			
R17	270K			
R18	390Ω			
R19	6800Ω			
R20	3300Ω			
R21	3300Ω			
R22	56K	1		
R23	270K			
R24	1500Ω			
R25	390K			
R26	180K			
R27	150Ω	2		
R28	390K			
R29	10K			
R30	100K			
R31	470K	1		Note 1

Note 1. Some versions may use 100K.

ITEM No.	RATING		LAFAYETTE PART No.	NOTES
	OHMS	WATT		
R32	820Ω			Note 2
R33	220K			Note 1
R34	1meg			Note 1
R35	300K			Note 1
R36	270K			
R37	1500Ω			
R38	68K			
R39	47K			
R40	270K			
R41	390Ω			
R42	6800Ω			
R43	3300Ω			
R44	3300Ω			
R45	56K	1		
R46	270K			
R47	1500Ω			
R48	390K			
R49	180K			
R50	150Ω	2		
R51	390K			
R52	470Ω			
R53	470Ω			
R54	18K	1		
R55	2200Ω	2		
R56	4.7Ω	1		
R57	4.7Ω	1		

Note 2. Some versions may use 1000Ω.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② L 1A	600VCT ③ .160A	6.3VCT ④ 2.8A	PT-164-3						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT ⑤ 2.7A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5800Ω CT	32Ω Tap ③ 16Ω, 8Ω	T165B	Z1011	A-2904①	AU-609	A-3870	24S55	S-55X	① Drill new mounting hole.
T3	5800Ω CT	32Ω Tap ③ 16Ω, 8Ω	T165B	Z1011	A-2904①	AU-609	A-3870	24S55	S-55X	

MISCELLANEOUS

ITEM No.	PART NAME	LAFAYETTE PART No.	NOTES
M1	Lamp		#47
M2	Switch	RS830-4	Selector (6 Position, Rotary Wafer Type)
M3	Switch		Amp. Reverse (DPDT, Slide Type)
M4	Switch		Stereo-Monaural (SPDT, Slide Type)
M5	Switch		Monitor On-Off (DPDT, Slide Type)
M6	Switch		Power On-Off (DPST, Slide Type)
M7	Switch		Phasing (DPDT, Slide Type)

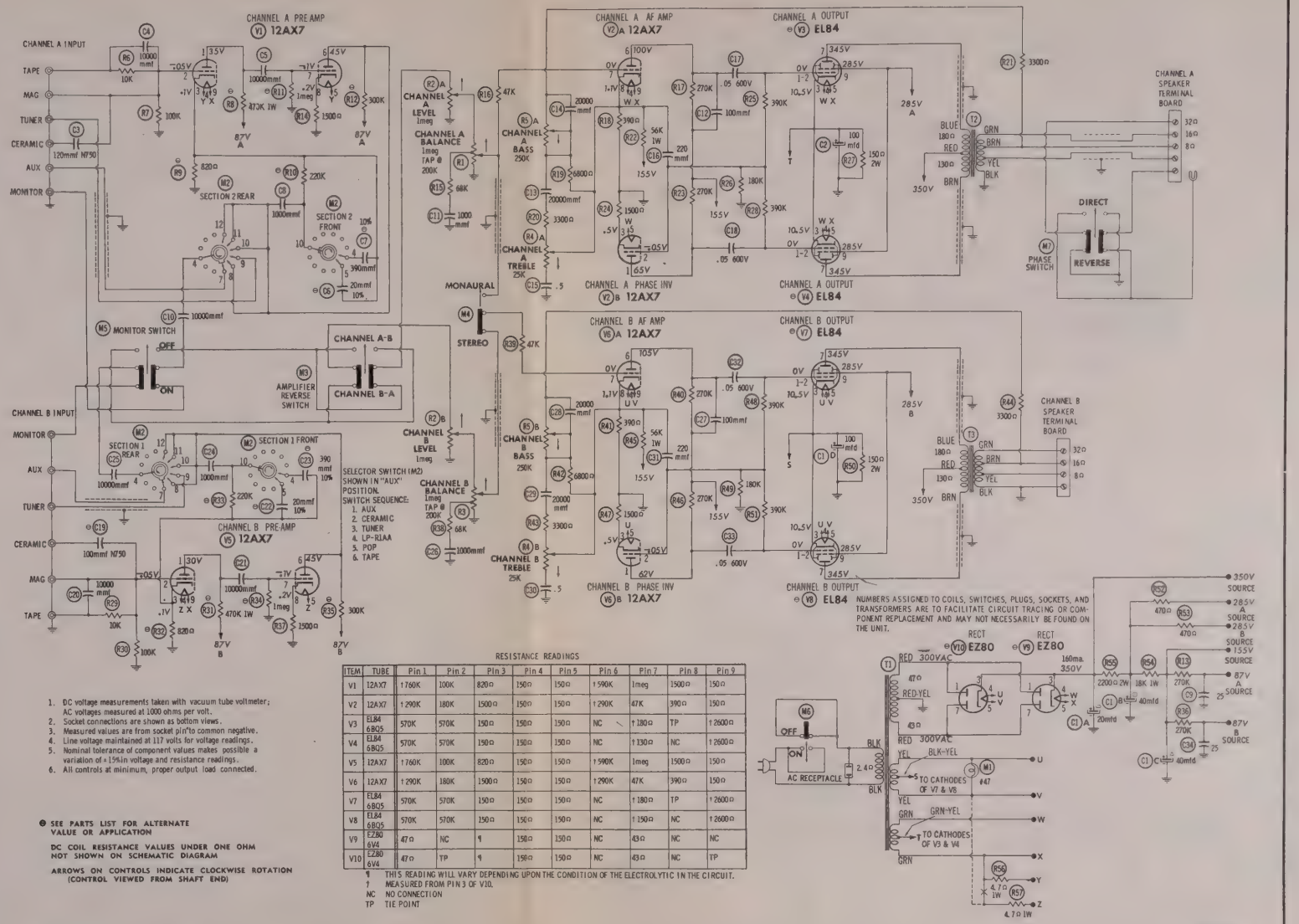
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†760K	100K	820Ω	150Ω	150Ω	†590K	1meg	1500Ω	150Ω
V2	12AX7	†290K	180K	1500Ω	150Ω	150Ω	†290K	47K	390Ω	150Ω
V3	EL84 6BQ5	570K	570K	150Ω	150Ω	150Ω	NC	†180Ω	TP	†2600Ω
V4	EL84 6BQ5	570K	570K	150Ω	150Ω	150Ω	NC	†130Ω	NC	†2600Ω
V5	12AX7	†760K	100K	820Ω	150Ω	150Ω	†590K	1meg	1500Ω	150Ω
V6	12AX7	†290K	180K	1500Ω	150Ω	150Ω	†290K	47K	390Ω	150Ω
V7	EL84 6BQ5	570K	570K	150Ω	150Ω	150Ω	NC	†180Ω	TP	†2600Ω
V8	EL84 6BQ5	570K	570K	150Ω	150Ω	150Ω	NC	†150Ω	NC	†2600Ω
V9	EZ80 6V4	47Ω	NC	¶	158Ω	150Ω	NC	43Ω	NC	NC
V10	EZ80 6V4	47Ω	TP	¶	158Ω	150Ω	NC	43Ω	NC	TP

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V10.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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LAFAYETTE MODEL LA-90

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

LAFAYETTE
MODEL PA-62

LAFAYETTE
MODEL PA-62

LAFAYETTE
MODEL PA-62

TRADE NAME	Lafayette Model PA-62
SUPPLIER	Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y.
TYPE SET	AC Operated 6 Tube Audio Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 87 Watts, .82 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H989

SET 444 FOLDER 9

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	
V2	AF Amplifier	12AX7	
V3	AF Amp. - Phase Inv.	12AX7	

ITEM No.	USE	TYPE	NOTES
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	LAFAYETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲40	400	①	AFH4-18	D0170	FP444.5 TC72	TMQ-18	TVL-4758.4	
B	■20	400							
C	▲20	350							
D	10	350							
C2	10	250		PRS350V10	BR1045	TC52	TD-10-250	TVA-1504	

① Some versions may use 40-30-10-20mfd @ 400-350-300-25 V in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	LAFAYETTE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C4	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C5	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	3000		10%		DI-3000				5GA-D3S 10% *	
C8	800		10%						5GA-T8S 10% *	
C9	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C10	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	5		10%		NPO-SI 5	D6-050	C10V5C		5TCCB-V5S 10% *	
C12	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C13	470		10%		DI-470	MD-471		JL-347	5GA-T47S 10% *	
C14	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

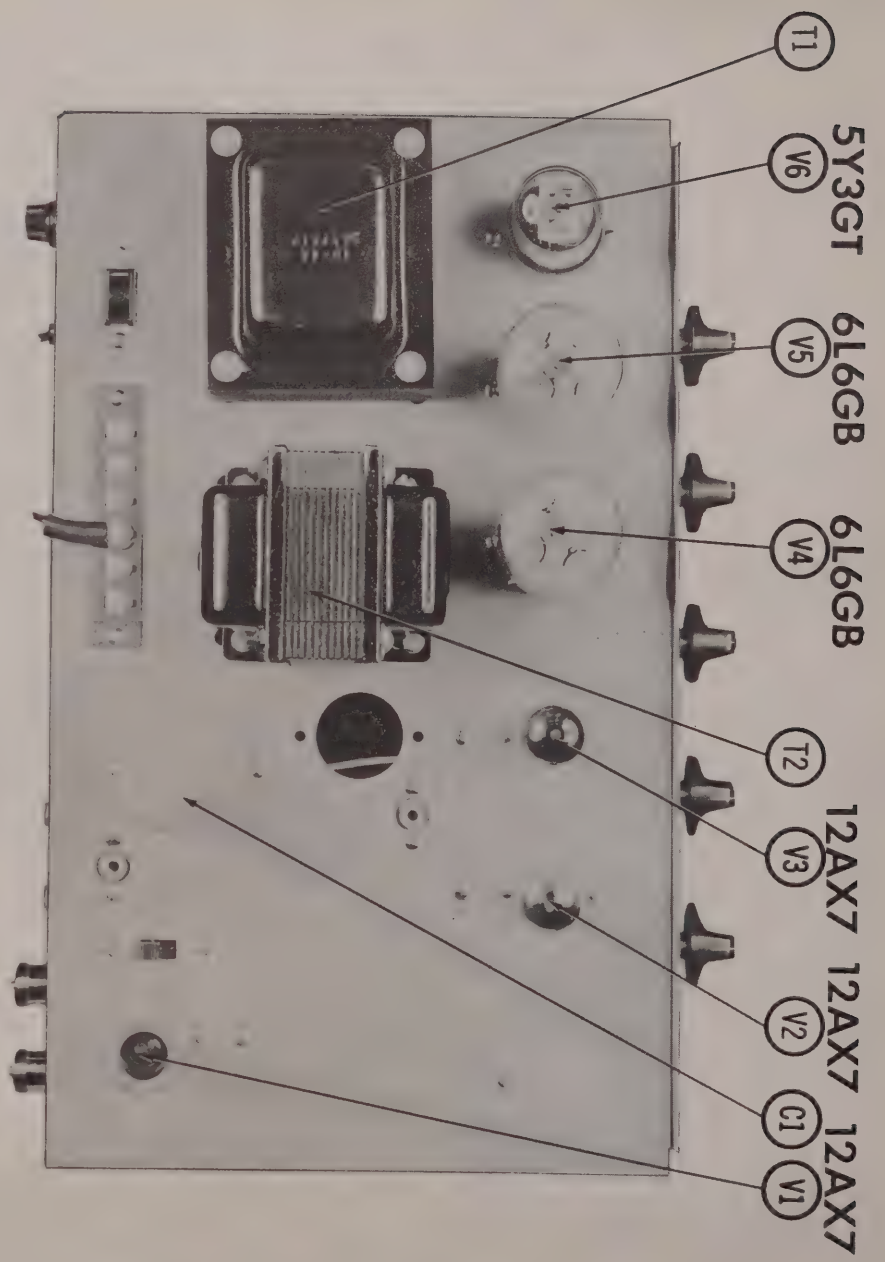
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LAFAYETTE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	GVC500K	B-60	A47-500K-Z	Q13-133	U48	Mic 1
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R2A	500K	½	GVC500K	B-60	A47-500K-Z	Q13-133	U48	Mic 2
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R3A	500K	½	GVC500K	B-60	A47-500K-Z	Q13-133	U48	Phono
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R4A	500K	½	GVC500K	B-60	A47-500K-Z	Q13-133	U48	Bass
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R5A	500K	½	G500KWS †	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Off-On

† Some versions may use a 2meg control in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	LAFAYETTE PART No.	NOTES
R6	47K			
R7	10K 5%			
R8	3.3meg			
R9	100K			
R10	3.3meg			
R11	100K			
R12	100K			
R13	470K			
R14	470K			
R15	470K			
R16	100K			
R17	1meg			
R18	1000Ω			

ITEM No.	RATING OHMS	RATING WATT	LAFAYETTE PART No.	NOTES
R19	470K			
R20	220K			
R21	1000Ω			
R22	100K			
R23	100K 5%			
R24	120K			
R25	3900Ω			
R26	5600Ω	2		
R27	120K			
R28	250Ω	10		
R29	1000Ω			
R30	22K			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .82A	700VCT @ .100A	5V @ 2A	TP4A		P-2952			24R04U	R-11B
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @ 2.9A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5700Ω CT	250Ω (70V) Tap @ 16Ω, 8Ω, 4Ω	TO-20P		A-3131		A-3800	22S97 ①	S-60A ①	① Drill new mounting holes.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA LAFAYETTE PART No. FUSE	LAFAYETTE PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V			312002. (3AG 2A 250V)	342001	AGC2	HKP

MISCELLANEOUS

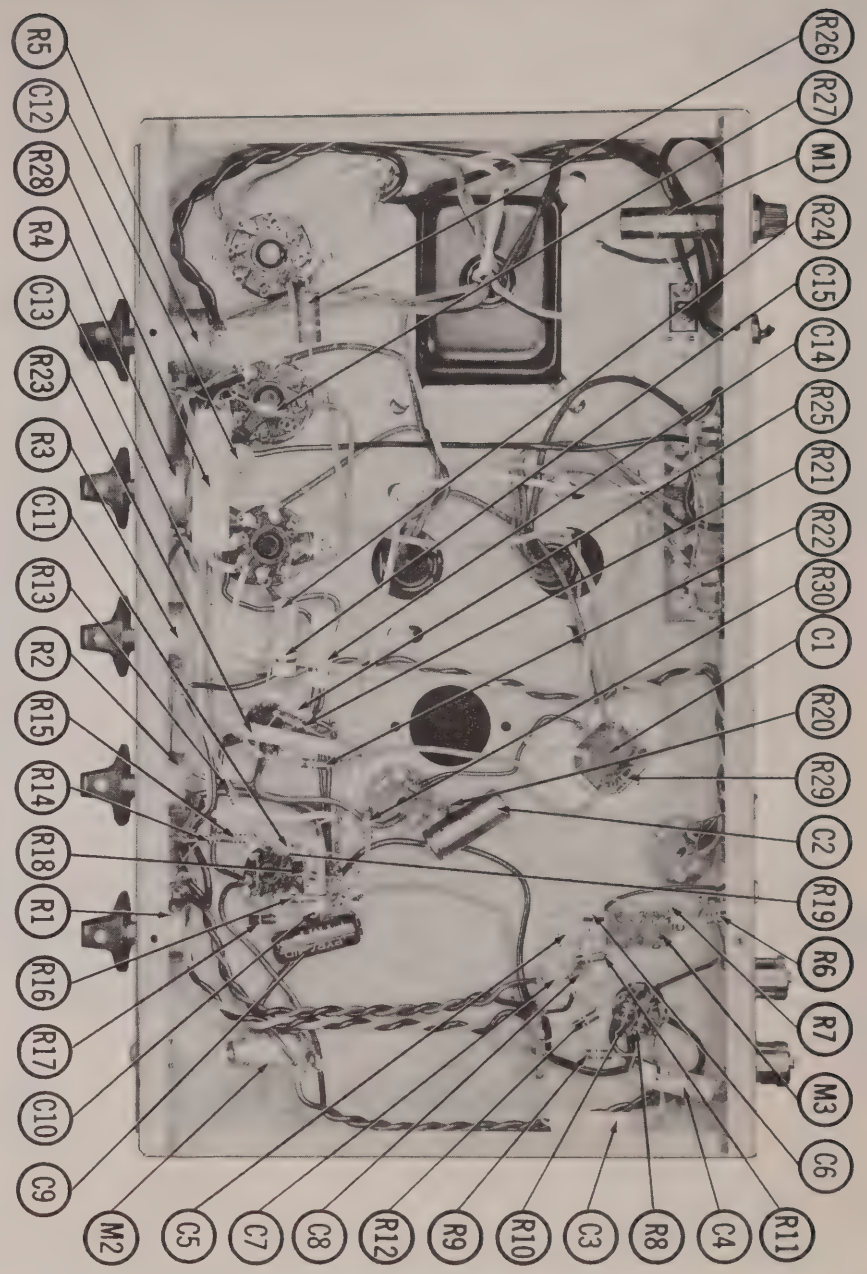
ITEM No.	PART NAME	LAFAYETTE PART No.	NOTES
M2	Lamp		#51
M3	Switch		Magnetic Pickup-Mic. 2 (DPDT, Slide Type)

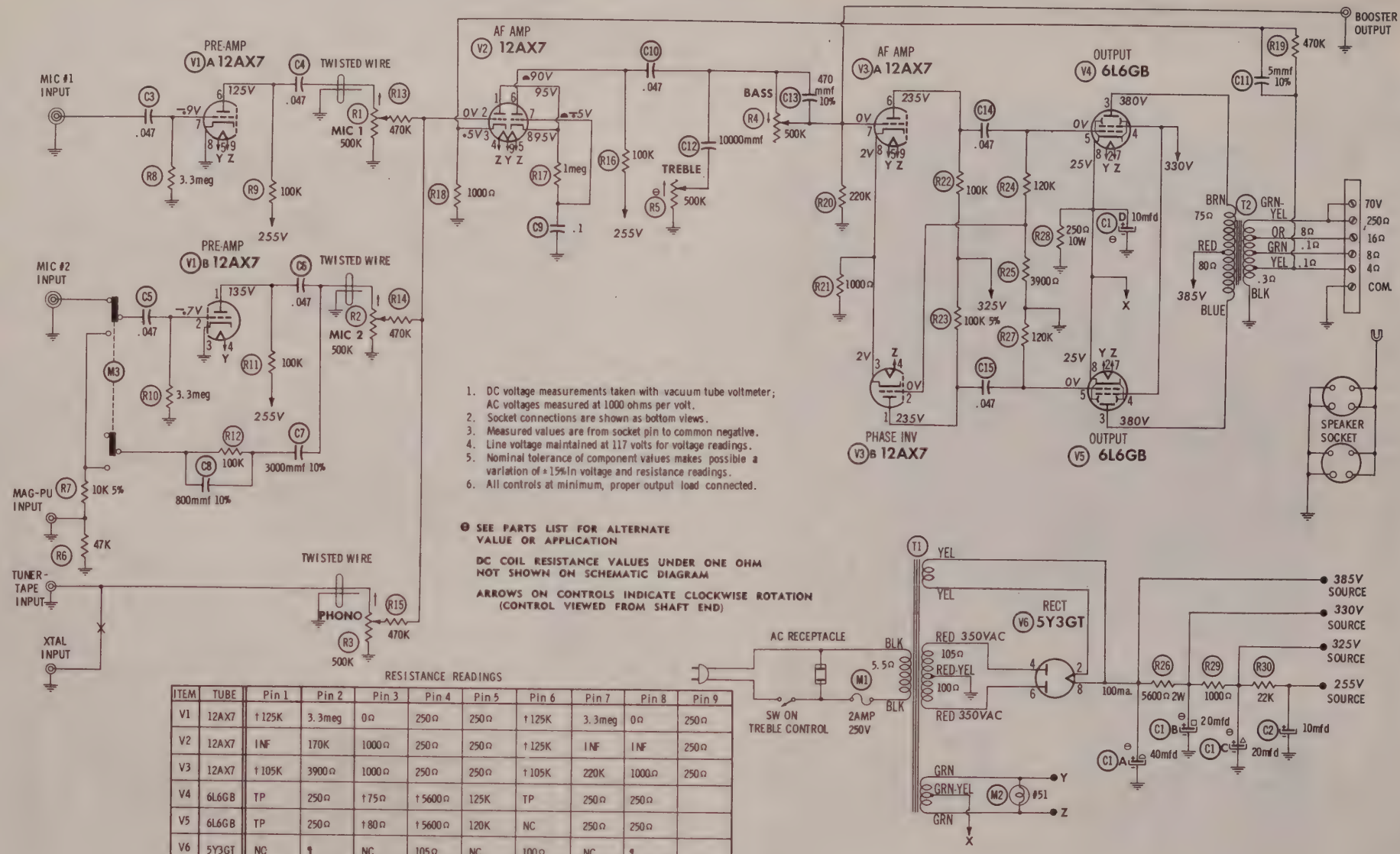
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS-BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❸ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†125K	3.3meg	0Ω	250Ω	250Ω	†125K	3.3meg	0Ω	250Ω
V2	12AX7	INF	170K	1000Ω	250Ω	250Ω	†125K	INF	INF	250Ω
V3	12AX7	†105K	3900Ω	1000Ω	250Ω	250Ω	†105K	220K	1000Ω	250Ω
V4	6L6GB	TP	250Ω	†75Ω	†5600Ω	125K	TP	250Ω	250Ω	
V5	6L6GB	TP	250Ω	†80Ω	†5600Ω	120K	NC	250Ω	250Ω	
V6	5Y3GT	NC	¶	NC	105Ω	NC	100Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 2 OF V6. NC NO CONNECTION
▪ MEASURED FROM PIN 8 OF V2. TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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LAFAYETTE MODEL PA-62

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

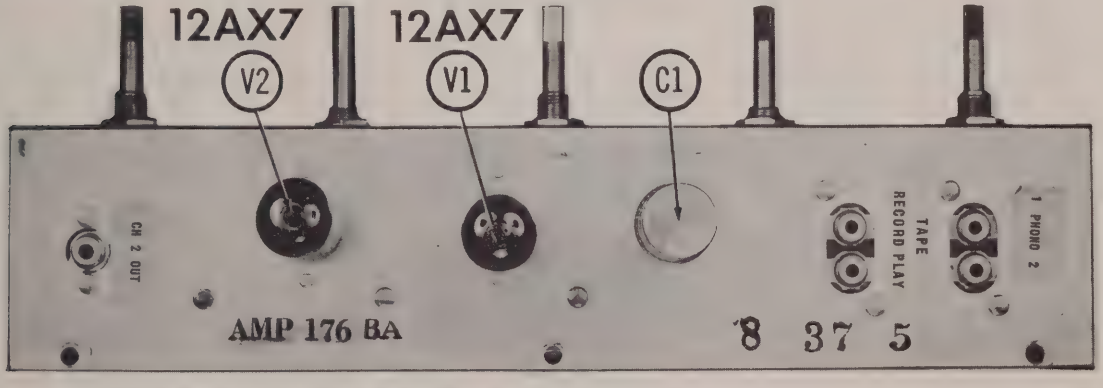
MAGNAVOX CHASSIS AMP-176BA

MAGNAVOX CHASSIS
AMP-176BA

MAGNAVOX CHASSIS
AMP-176BA

TRADE NAME	Magnavox Chassis AMP-176BA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Externally Powered 2 Tube Stereo Preamplifier With 4 Speed Automatic Record Changer

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR COLLARO RC456 - PHOTOFACT SET 342 FOLDER 3 OR RECORD CHANGER MANUAL RC-10



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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J57

SET 444 FOLDER 10

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel 1 Preamp.	12AX7	

ITEM No.	USE	TYPE	NOTES
V2	Channel 2 Preamp.	12AX7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	20	250	270026-5	AFH1-27	A0270	FP125	TD-20-250	TVLS-1509.1*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C3	1000		10%	250218-8	DI 1000			JL-210	5GA-D1S 10%*	
C4	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C5	1500			250218-18	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C6	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C8	220			250218-5	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C9	39		N750 10%				C10Q39U	CN7-439	5TCU-Q39S 5%*	①
C10	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C11	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C12	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C13	1000		10%	250218-8	DI 1000			JL-210	5GA-D1S 10%*	
C14	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C16	1000			250218-8	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C17	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C18	1500			250218-18	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C19	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C20	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C21	39		N750 5%				C10Q39U	CN7-439	5TCU-Q39S 5%*	①
C22	220			250218-5	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C23	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C24	100			250218-22	BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C25	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C26	1000		10%	250218-8	DI 1000			JL-210	5GA-D1S 10%*	
C27	10000			250218-19	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

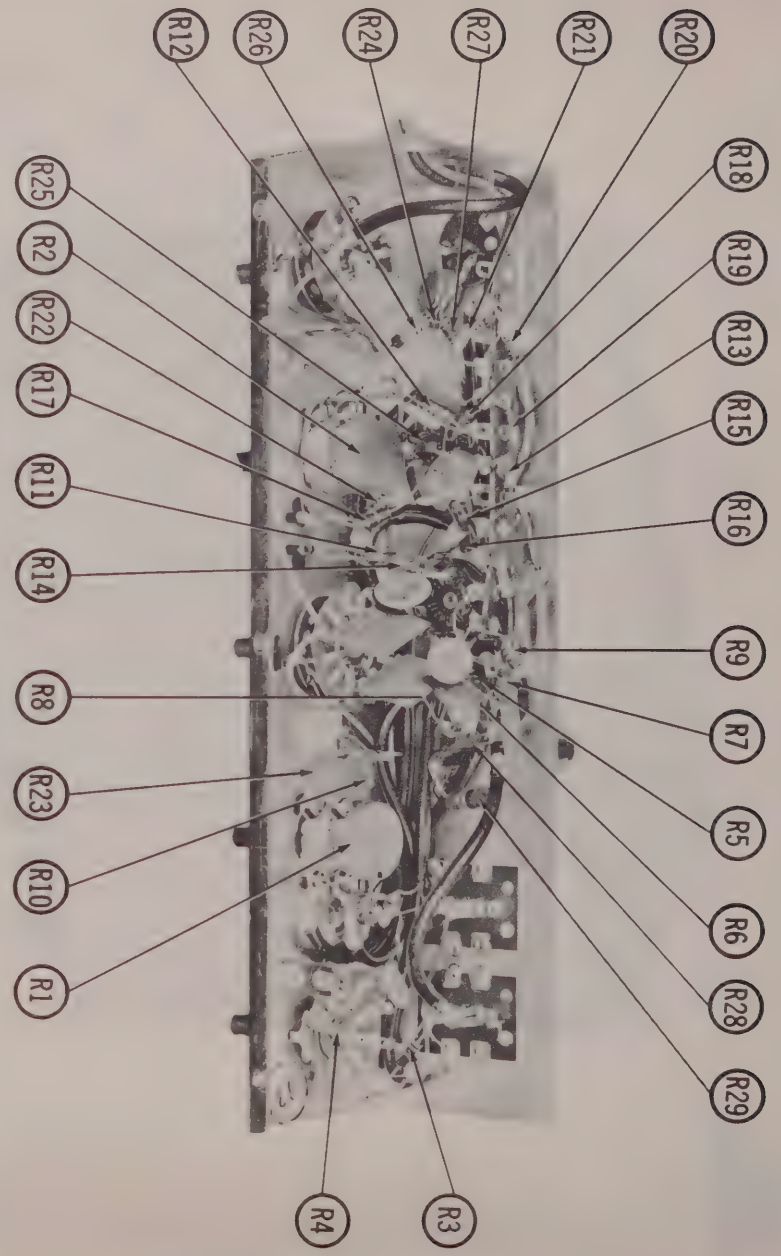
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use 47mmf in this application (Part #250218-17).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	220151-7				■ UE3957	Loudness, Chan. 2 Tap @ 120K
B	1meg	½						Loudness, Chan. 1 Tap @ 120K
R2A	1meg	½	220151-8	B-70	AD47-1meg-Z	Q13-137		Timbre, Chan 2
B	1meg	½		SR-70	Not Req.	M13-137		Timbre, Chan 1
C	Shaft			Not Req.	FS-3	Not Req.	■ UE3913	

■ "STA-LOC" Equivalent: FB16T15, RU16T15, CS3500
† "STA-LOC" Equivalent: FA16A, RU16A, CS3500

CHASSIS-BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MAGNAVOX PART No.	NOTES
R3	3.3meg		230104-104	
R4	22K		230104-78	
R5	3.3meg		230104-104	
R6	68K		230104-84	
R7	330K		230104-92	
R8	3300Ω		230104-68	
R9	680K		230104-96	
R10	68K		230104-84	
R11	1meg		230104-98	
R12	330K		230104-92	
R13	100K		230104-86	
R14	1500Ω		230104-64	
R15	3.3meg		230104-104	
R16	22K		230104-78	
R17	3.3meg		230104-104	
R18	68K		230104-84	
R19	33K		230104-80	
R20	680K		230104-96	
R21	330K		230104-92	
R22	3300Ω		230104-68	
R23	68K		230104-84	
R24	1meg		230104-98	
R25	100K		230104-86	
R26	330K		230104-92	
R27	1500Ω		230104-64	
R28	33K		230104-80	
R29	100K	1	230105-86	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA	
K1	Channel A Treble Circuit	2000mmf, 5000mmf, 6800mmf, 10K, 27K, 47000Ω	250292-1	Sprague	TCS-17
K2	Channel A Bass Circuit	6800mmf, 15000mmf, 47000mmf, 5000mmf, 6800Ω, 56K, 1meg	250291-1	Sprague	TCS-16
K3	Channel B Treble Circuit	2000mmf, 5000mmf, 6800mmf, 10K, 27K, 47000Ω	250292-1	Sprague	TCS-17
K4	Channel B Bass Circuit	6800mmf, 15000mmf, 47000mmf, 5000mmf, 6800Ω, 56K, 1meg	250291-1	Sprague	TCS-16

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M1	Switch	160294-1	Stereo-Tape-Phono (Rotary Wafer Type)
M2	Switch	160278-1	Treble Concert-Mood (Rotary Wafer Type)
M3	Switch	160278-1	Bass (4 Position, Rotary Wafer Type)

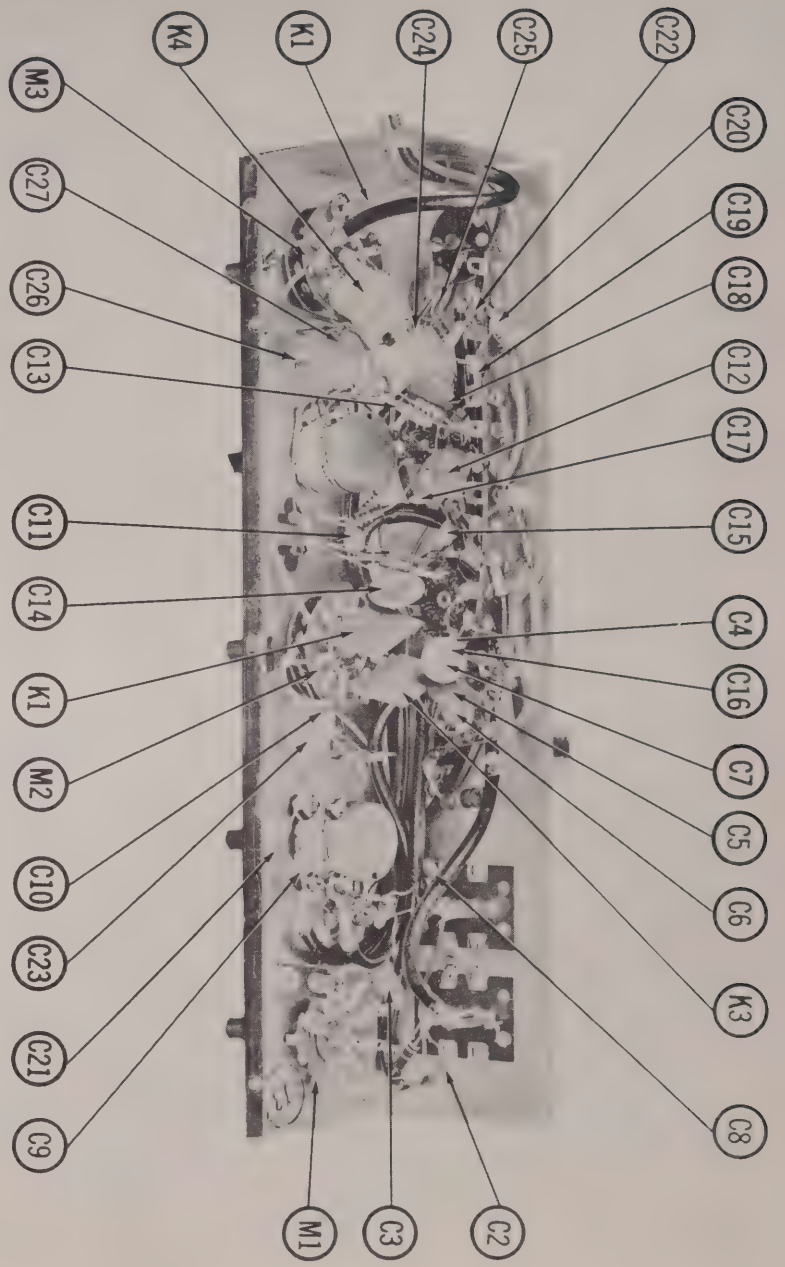
CABINETS & CABINET PARTS

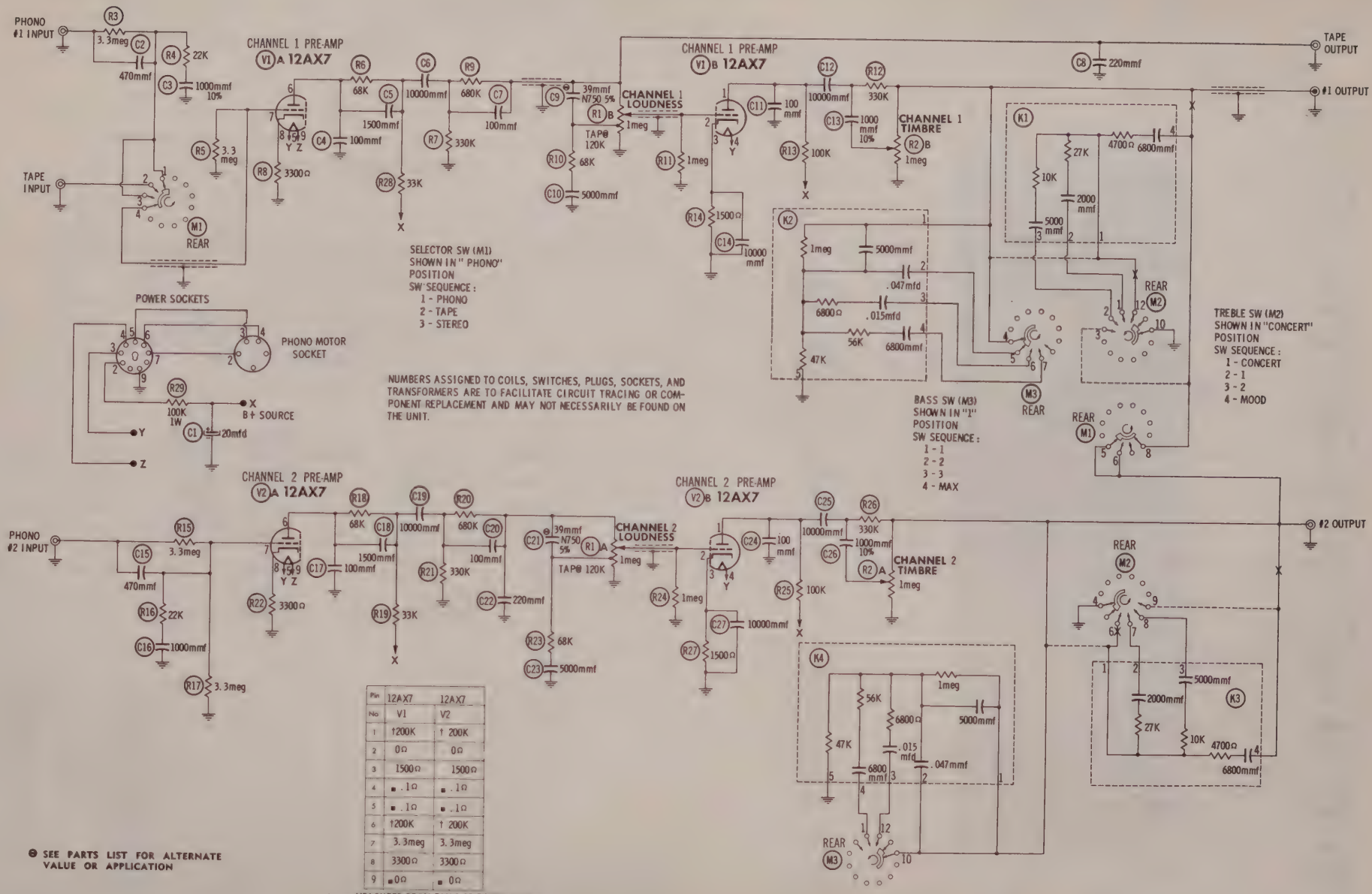
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS-BOTTOM VIEW





Pin No	12AX7 V1	12AX7 V2
1	†200K	† 200K
2	0Ω	0Ω
3	1500Ω	1500Ω
4	▪ .1Ω	▪ .1Ω
5	▪ .1Ω	▪ .1Ω
6	†200K	† 200K
7	3.3meg	3.3meg
8	3300Ω	3300Ω
9	▪0Ω	▪ 0Ω

† MEASURED FROM PIN 2 OF POWER PLUG
▪ MEASURED FROM PIN 4 OF POWER PLUG

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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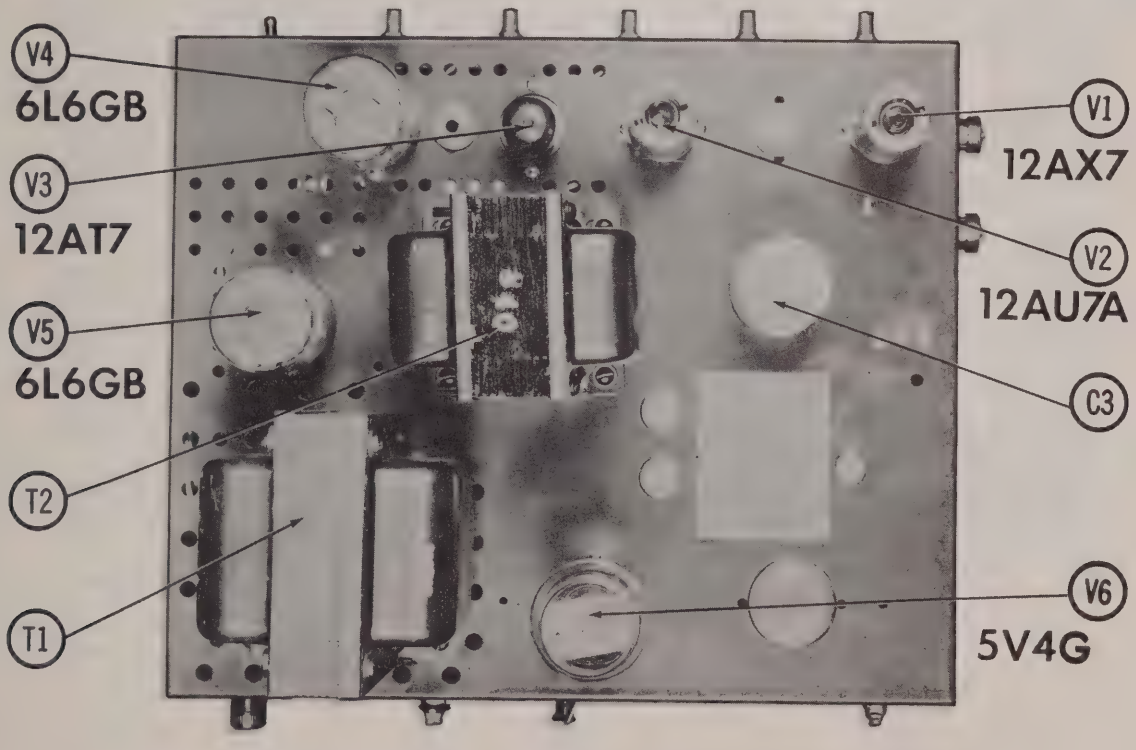
MAGNAVOX CHASSIS AMP-176BA

PHOTOFACT* Folder

MODEL A-36

TRADE NAME	Masco Models A-36, AS-36
MANUFACTURER	Mark Simpson Mfgr., Co., Inc., 32-28 49th St., Long Island City 3, N. Y.
TYPE SET	AC Operated 6 Tube, 3 Channel Audio Amplifier
POWER SUPPLY	110 - 120/130 Volts AC, 50-60 Cycles RATING 130 Watts, 1.15 Amp. @117 Volts AC

SOME VERSIONS MAY HAVE A MODEL MP-3 PHONO TOP



MASCO MODELS
A-36, AS-36

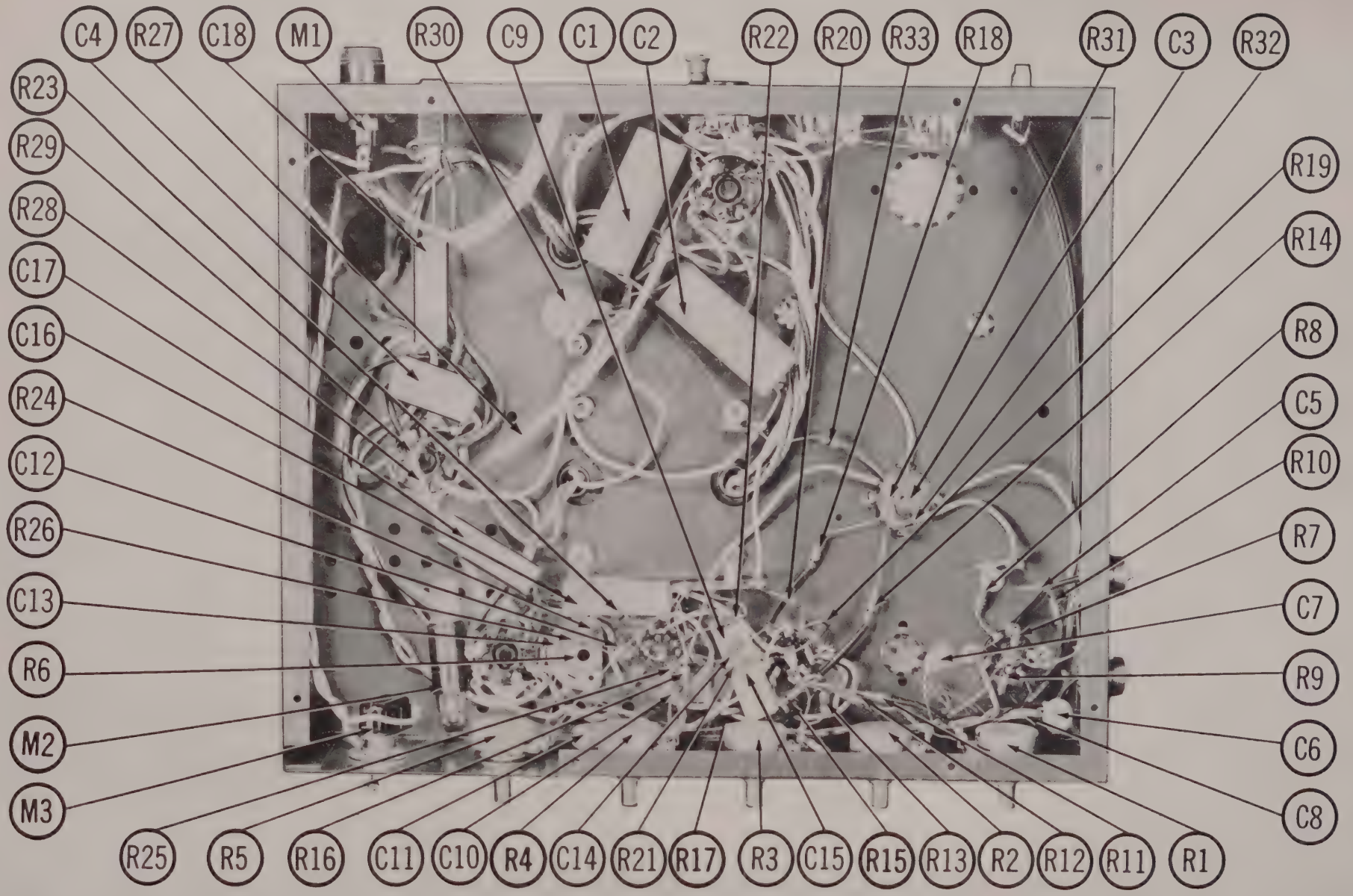
MASCO MODELS
A-36, AS-36

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J43

SET 444 FOLDER 11



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic 1 Preamp. -Mic 2 Pre-amp.	12AX7	
V2	AF Amplifier	12AU7A	①
V3	AF Amp. -Phase Inv.	12AT7	
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	5V4G	

① Some versions use a 12AT7 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	16	450		PRS450V16	BR1645	TC74	TD-16-450	TVA-1708	
C2	16	450		PRS450V16	BR1645	TC74	TD-16-450	TVA-1708	
C3A	▲10	450		AFH4-10	D0088	FP434	TMQ-10	TVLS-3776.1*	
B	■10	450							
C	▲10	450							
C4	50	50		PRS50V50	BR505	TC39	TD-50-50	TVA-1308	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C6	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C8	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C9	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C10	5000				BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C11	.05	200			P288N-05	DF-503	CUB2S5	GEM-215	2TM-S5	
C12	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C13	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C14	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	470		10%		DI-470	D6-471	5R5T47	JL-347	5GA-T47S 10%*	①
C16	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C17	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C18	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	BA811-743	B-60	A47-500K-Z	Q13-133	U48	Mic 1, Volume
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R2A	500K	½	BA811-743	B-60	A47-500K-Z	Q13-133	U48	Mic 2, Volume
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R3A	500K	½	BA811-743	B-60	A47-500K-Z	Q13-133	U48	Phono-Radio, Volume
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R4A	500K	½	BA811-743	B-60	A47-500K-Z	Q13-133	U48	Bass
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R5A	500K	½	BA811-743	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R6A	50Ω	2 ww	1328	WW-500	A43-50		C50P	Hum Balance
B	Shaft			Not Req.	FKS-½		Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MASCO PART No.	NOTES
	OHMS	WATT		
R7	1meg			
R8	270K			
R9	1meg			
R10	270K			
R11	270K			
R12	270K			
R13	470K			
R14	100K			
R15	1000Ω			
R16	100K			
R17	10K			
R18	100K			
R19	1000Ω			
R20	270K			
R21	470K			
R22	47K			
R23	1000Ω			
R24	10K			①
R25	47K			
R26	270K			
R27	2500Ω	10		
R28	200Ω	10		
R29	270K			
R30	10K	20		
R31	47K			
R32	47K			
R33	10K			

① Some versions may use a 8200Ω in this application.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MASCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	130V Tap ⓐ 117V ⓐ 1.15A	760 VCT ⓐ .160A	5V ⓐ 2A	P-236	P9402①②	P-3155①②		PC8411①②	22R33①②	R-18A①②
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 2.9A									

① Drill new mounting hole. ② Does not have 130V winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MASCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6000Ω CT	500Ω Tap ⓐ 70V, 16Ω, 8Ω, 4Ω	T-236							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MASCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V			312003. (3AG 3A 250V)	342001	AGC3	HKP

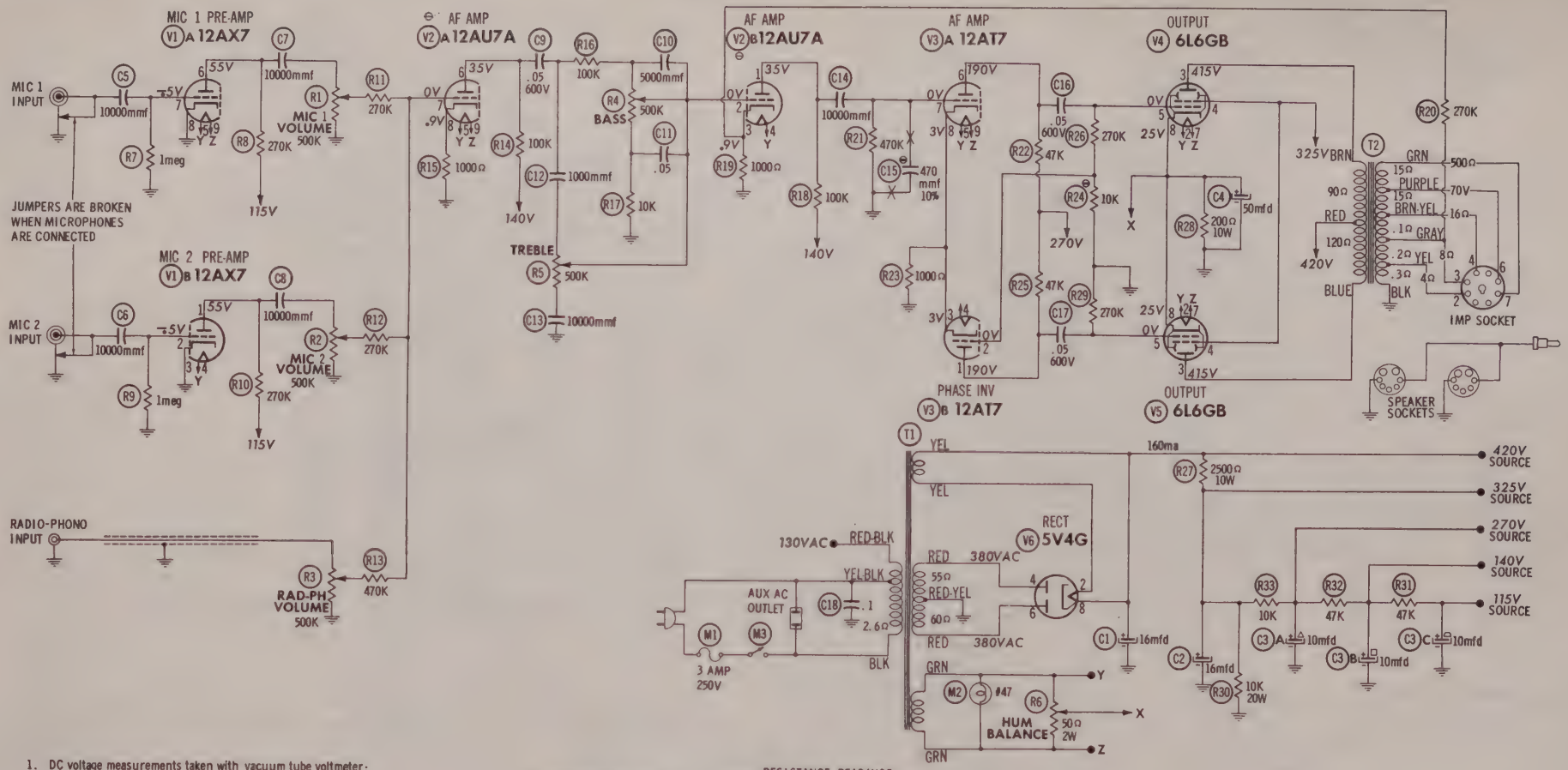
MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
M2	Lamp		#47
M3	Switch		Power On-Off (SPST, Toggle Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†375K	1meg	0Ω	220Ω	220Ω	†375K	1meg	0Ω	220Ω
V2	12AU7A	†160K	10K	950Ω	220Ω	220Ω	†160K	100K	1000Ω	220Ω
V3	12AT7	†60K	10K	1000Ω	220Ω	220Ω	†60K	470K	1000Ω	220Ω
V4	6L6GB	NC	220Ω	†90Ω	†2500Ω	280K	TP	220Ω	200Ω	
V5	6L6GB	TP	220Ω	†120Ω	†2500Ω	270K	NC	220Ω	200Ω	
V6	5V4G	NC	¶	NC	55Ω	NC	60Ω	TP	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION
TP TIE POINT

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MASCO MODELS A-36, AS-36

PHOTOFACT* Folder

MIRACORD MODEL
XS200

MIRACORD MODEL
XS200

GENERAL INFORMATION

Miracord Model XS 200 record changers play a stack of records in automatic sequence and shut off after the last record has been played. As many as ten 10-inch, eight 12-inch, or any assortment of 10-inch and 12-inch records of the same speed and same type of groove can be intermixed in any order. The stack of records should not exceed 7/ 8 inches in height; the limit is indicated by a colored mark at the top of the spindle.

To play records having a large center hole, put on the special record spindle (available as an accessory). Be certain the bottom end of the spindle engages the three humps on the rubber mat. A colored mark indicates the limit the records can be stacked.

After the last record of a stack has been played, the pickup arm is returned to its rest post, and the changer is automatically shut off.

This record changer must be connected to an AC supply only. It is adapted for 110 or 220 volts, 60 cycles. The record changer is adjusted to be operated from 110 volts when it leaves the factory.

Manufactured by:
Electroacustic
GMBH, Kiel, Germany

Imported by:
Audiogersh Corporation
514 Broadway
New York 12, N. Y.

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

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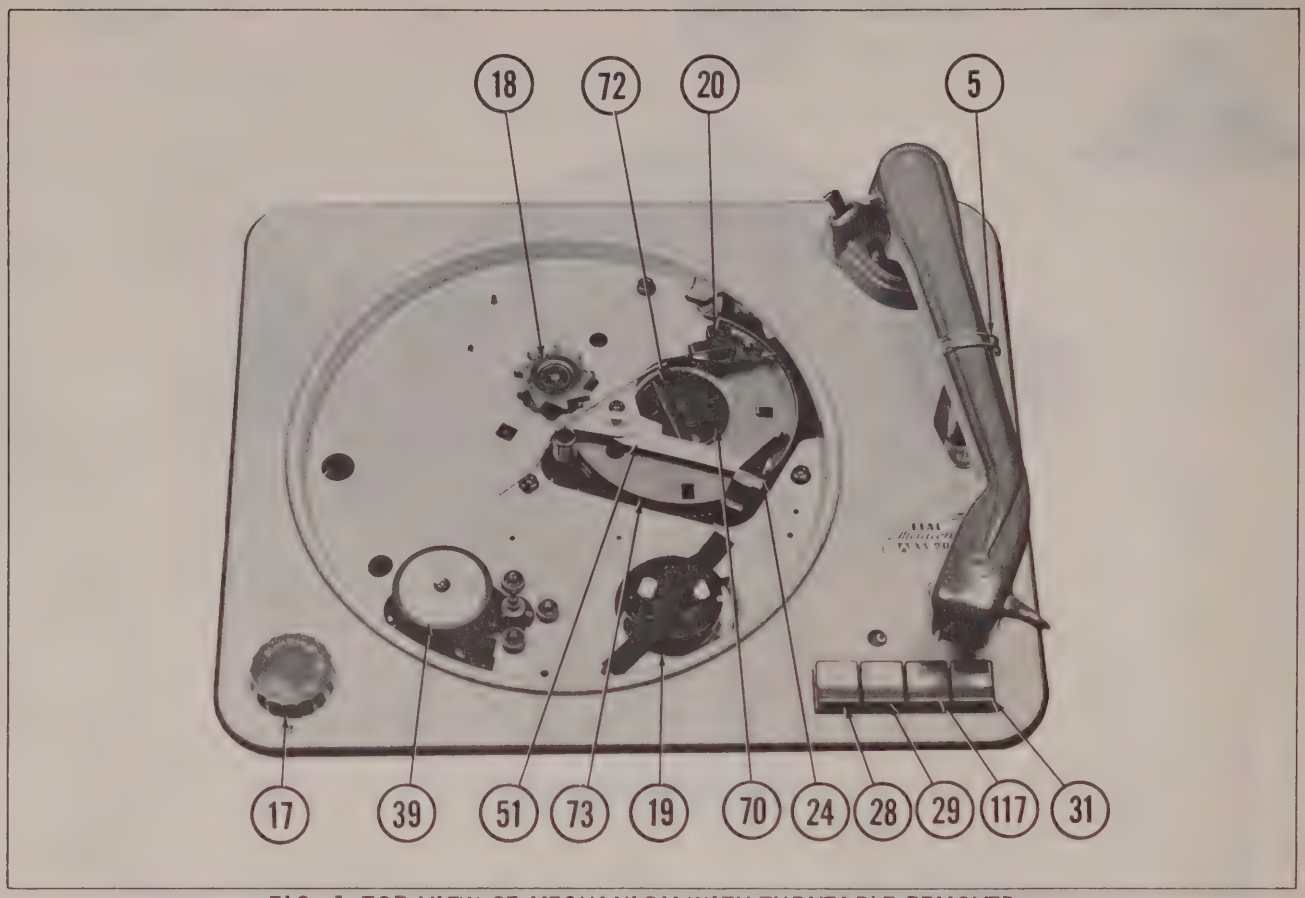


FIG. 1 TOP VIEW OF MECHANISM WITH TURNTABLE REMOVED

PREPARING FOR OPERATION

1. Remove safety guard from needle.
2. Remove securing latch from tone arm.
3. Insert spindle for automatic play or for manual play in hole in center of turntable.
4. Turn needle, cartridge, and speed selector for type of records to be played.

FUNCTION OF CONTROLS

Start Button

Depressing this button starts the changer. A record may be rejected at any time by depressing this button.

Stop Button

Depressing this button stops the changer immediately. The operator can leave any remaining records on the spindle and resume playing at any time by depressing the Start button.

Pause Button

With this button, the changer can be set for a time lapse between each record. Interval position is indicated through a small window directly above the Pause button. The following chart shows settings for anywhere from 5 seconds to 12 minutes and 30 seconds.

	Settings				
RPM	0	1	2	3	4
78	5 sec.	35 sec.	1 min. 10 sec.	1 min. 40 sec.	2 min. 20 sec.
45	9 sec.	1 min.	2 min.	3 min.	4 min.
33 1/3	12 sec.	1 min. 20 sec.	2 min. 40 sec.	4 min.	5 min. 30 sec.
16 2/3	25 sec.	3 min. 20 sec.	6 min. 30 sec.	9 min.	12 min. 30 sec.

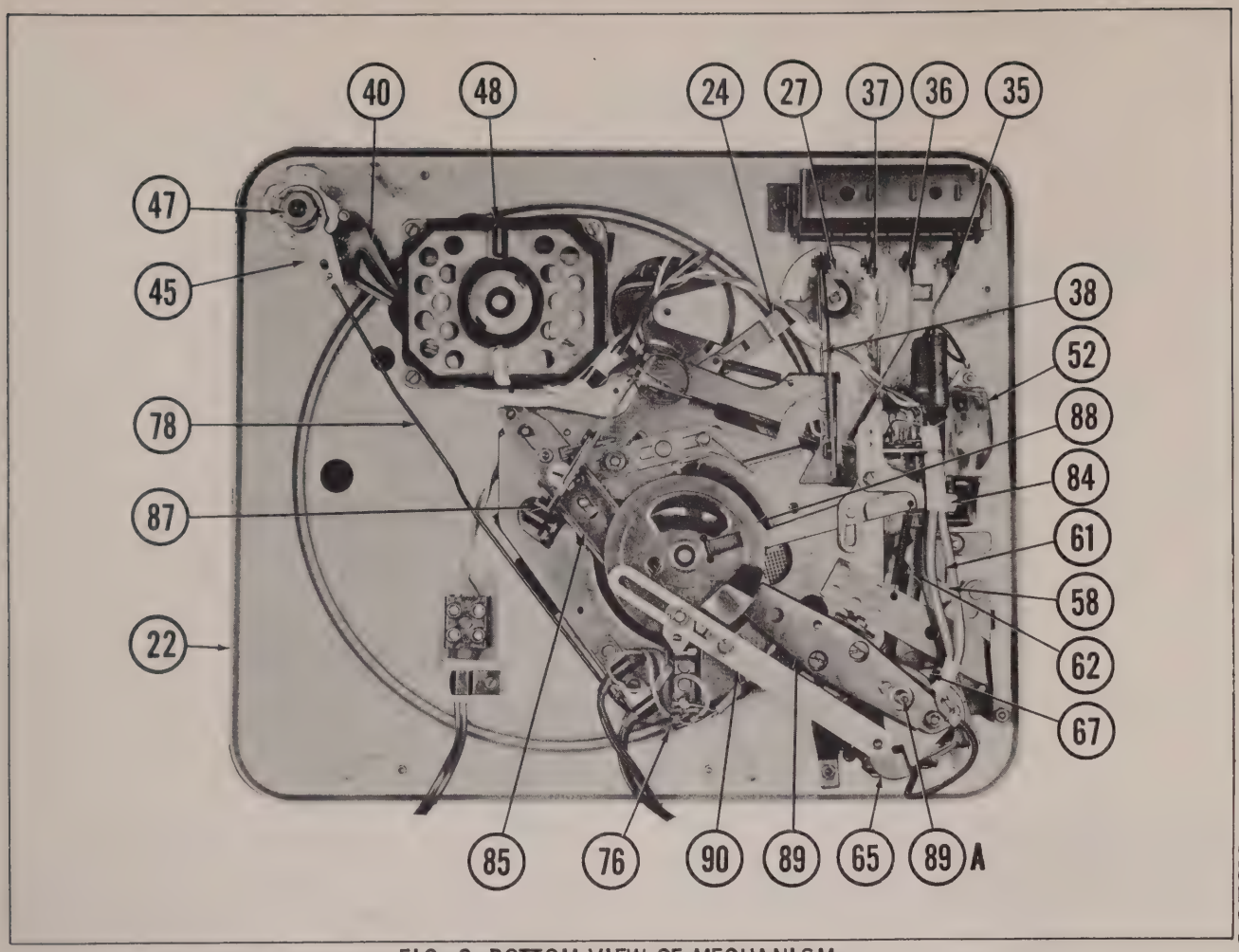


FIG. 2 BOTTOM VIEW OF MECHANISM

The Pause control operates in the following manner:

Pauses are introduced between records only when the pause mechanism is switched on (positions 1 to 4). This process is carried out by the tooth segment underneath cogwheel (80). The tooth segment is moved inward, and a gap in the teeth of cogwheel (80) is made by pause gap actuating lever (91).

Interval disc (73) has four stop dogs on top. The stop dogs stop the disc at a certain angle of arc, depending on the position of pause lever (24), which is actuated by the Pause push button. When the pause gap is open, cogwheel (80) stops rotating. Rubber cogwheel (18) is pivoted by pause drive axle lever (51), which is pivoted by slide piece (72). Pause drive ring (49), on the shaft of rubber cogwheel (18), is moved against the rim of interval disc (73).

During each revolution of the turntable, the outermost pin underneath the turntable strikes and moves rubber cogwheel (18). Interval disc (73) slowly follows the rotation through the action of pause drive ring (49). Interval disc (73) now strikes a catch bolt on cogwheel (80) and turns cogwheel (80). The pause gap is bridged, and the changer can continue on through its cycle.

Repet (Repeat) Button

To repeat an entire record, depress the Repet button while the record is playing. After the record has finished playing, the tone arm will return to the beginning of the record, and the record (either 10-inch or 12-inch) will be repeated.

To repeat the same record without touching the tone arm, depress the Repet and Start buttons at the same time. The tone arm will move over and set down at the beginning of the record.

The repeat control operates in the following manner:

When the Repet button is depressed, spindle actuating lever (85) is blocked by repeat bar (86). As a result, record spindle (1) will not be actuated when the changer goes through its cycle. An instant before cam disc (88) completes its revolution, the nose on the outer surface strikes and pushes repeat bar (86) into its normal position. The changer will now continue to change each record in sequence until the Repet button is again depressed.

Filter Button

The filter limits the reproduction of higher fre-

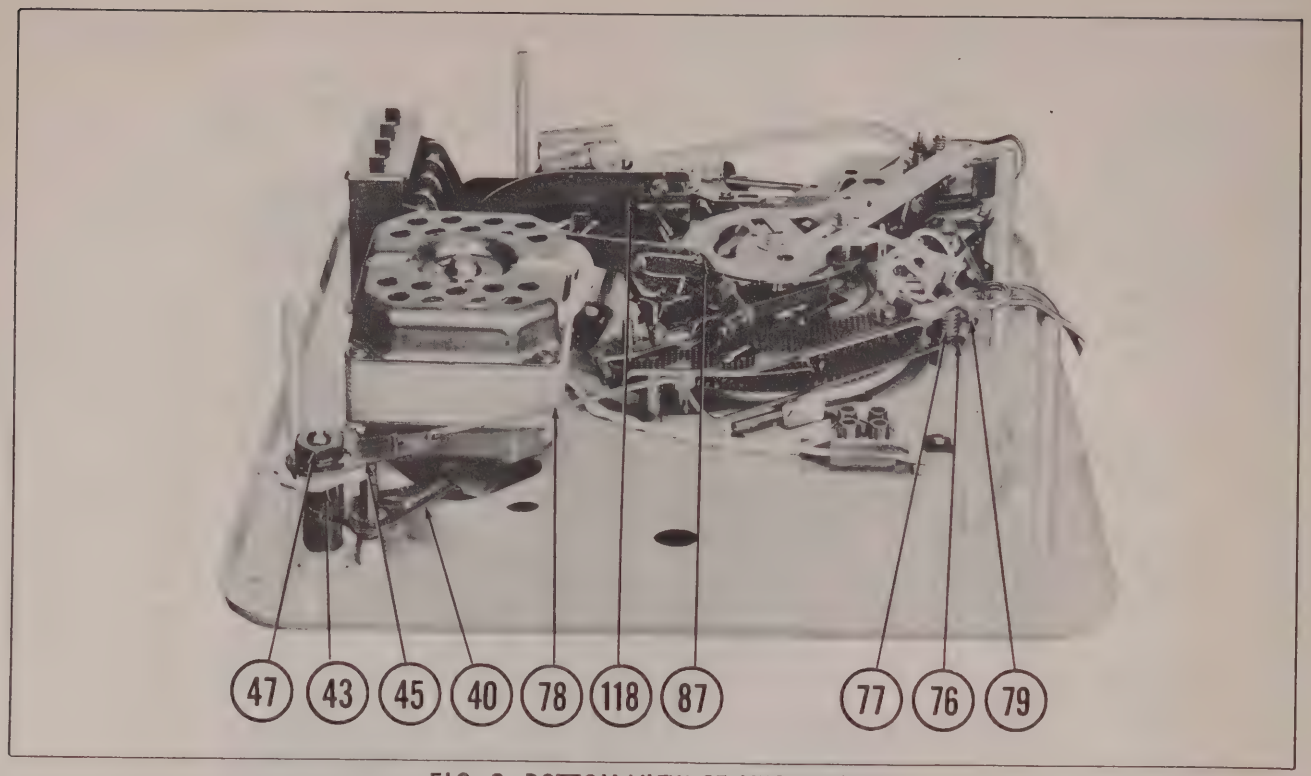


FIG. 3 BOTTOM VIEW OF MECHANISM

quencies. Any scratching noises when old records are being played are thus reduced. Pushing the button forward switches in the filter; pushing the button backward switches out the filter.

Speed Control knob

The speed control knob determines the turntable speed.

NOTE: When changer is not being used, the speed control knob should be placed in the "O" position to prevent flat spots from developing on the idler wheel tire.

OPERATING INSTRUCTIONS

Loading

Place a stack of eight 12-inch or ten 10-inch records, or a corresponding mixture of both, on the spindle. Gently lower to the three protruding fingers on the spindle.

NOTE: Intermixed records must be the same speed and have the same type of groove.

Starting

Be sure the stylus and speed controls are in the position corresponding to the type of records to be played. To start the changer, depress the Start button, hold momentarily, and release. The changer will operate automatically until the last record has been played. After the last record has been played, the tone arm returns to its rest, and the supply to the motor is switched off.

Rejecting

A record can be rejected at any time by depressing the Start button.

Stopping

The changer can be stopped at any time by depressing the Stop button. The tone arm may then be placed on its rest.

Continuous Play

For continuous play, insert the single-play spindle instead of the changer spindle inversely into the center hole of the turntable. Place a 10-inch record on the turntable. Check the rpm and stylus setting, and depress the Start button. To switch off the changer, place the tone arm on its rest.

NOTE: Twelve-inch records cannot be played continuously.

Using as a Manual Record Player

Insert the single-play spindle into the center hole of the turntable. Place a record on the turntable. When a 12-inch record is being played, its edge will automatically touch scanning lever (15A), which sets the mechanism for a 12-inch setdown.

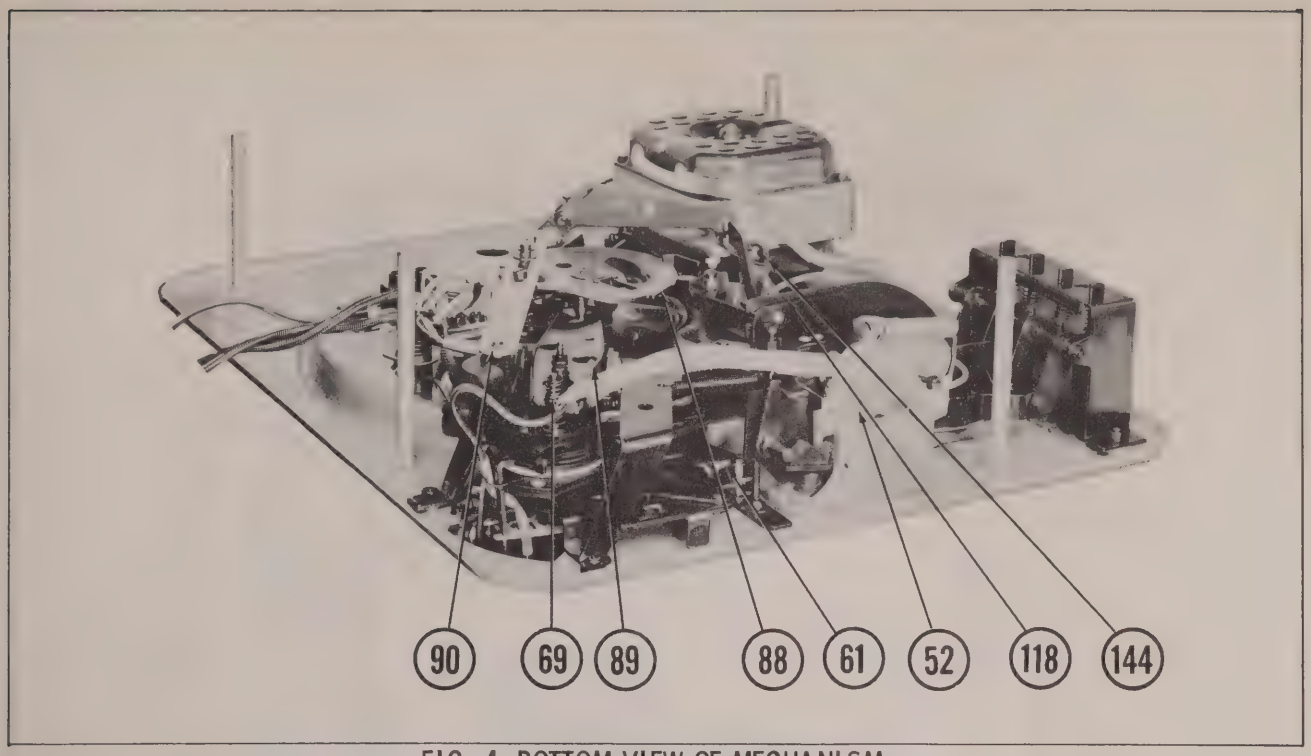


FIG. 4 BOTTOM VIEW OF MECHANISM

To Play a 7-inch record with a 1 1/2-inch center hole, place the adapter on the single-play spindle and engage the adapter in the three humps on the rubber turntable mat.

Operate the changer as previously described. After the record has finished playing, the pickup arm will return to its rest, and the changer will shut off automatically.

CHANGE CYCLE

Observe the change cycle while rotating the turntable by hand. The following action can then be readily followed, and the function of each part can be more easily understood.

To Start Record Changing Cycle

The record changing cycle is started by start lever (84). Start lever (84) is actuated by the Start button being depressed or by weighted segment (62) when the stylus moves into the trip groove after the record has finished playing.

Drive

The changer is driven by a 4-pole AC induction motor (48). A 4-step drive pulley is mounted on the motor shaft. When the speed control knob is turned, idler wheel (39) is adjusted to ride on different steps of the drive pulley by idler pivot lever (40) and speed cam worm (42).

Idler wheel (39), between the motor drive pulley and the turntable rim, is held firmly in contact with these parts by tension spring (23), and drives the turntable at a constant speed.

To prevent flat spots from developing on idler wheel (39) when the changer is not being used, idler wheel (39) is pulled away from the motor pulley when the speed control knob is placed in one of the "O" positions.

Cycling Mechanism

Depressing the Start button causes lever (35) to actuate line switch (52) and start lever (84) at the same time. As start lever (84) is actuated, it contacts and moves cycle starting catch (81). The rubber bumper on the end of starting catch (81) is moved into contact with the lower driving surface on the turntable hub. Contact between the rubber bumper on cycle starting catch (81) and the turntable hub gives the necessary push for the teeth in cogwheel (80) to engage the teeth in the turntable hub. As a result, cogwheel (80) and cam disc (88) rotate. As cam disc (88) begins rotating, tone arm control lever (89) rides up an incline on the outer edge of cam disc (88) and raises the tone arm. An eccentric mounted pin on cam disc (88) engages tone arm coupling rod (90). Tone arm coupling rod (90) then actuates tone arm actuating lever (65) and moves the tone arm away from the turntable.

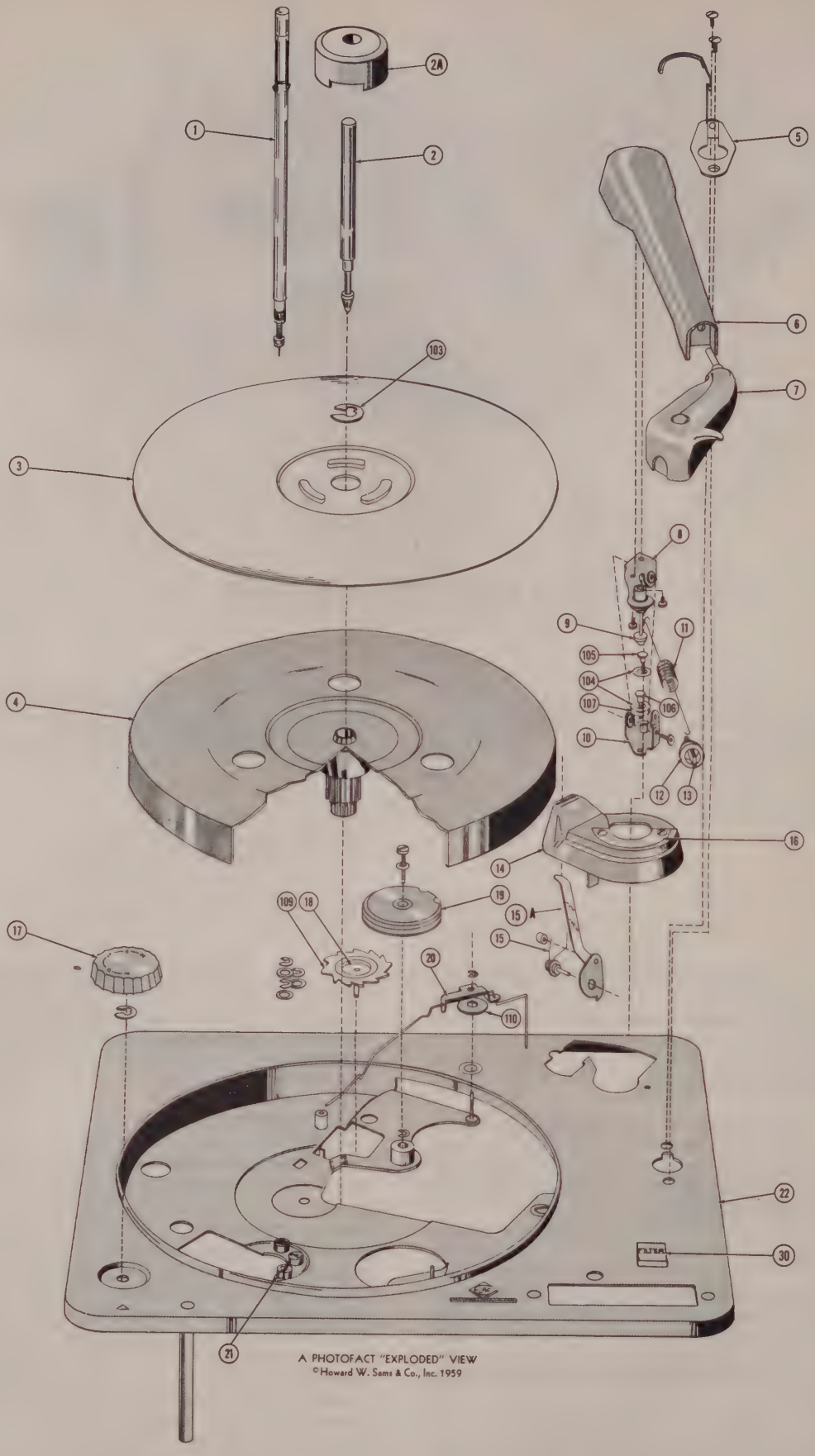
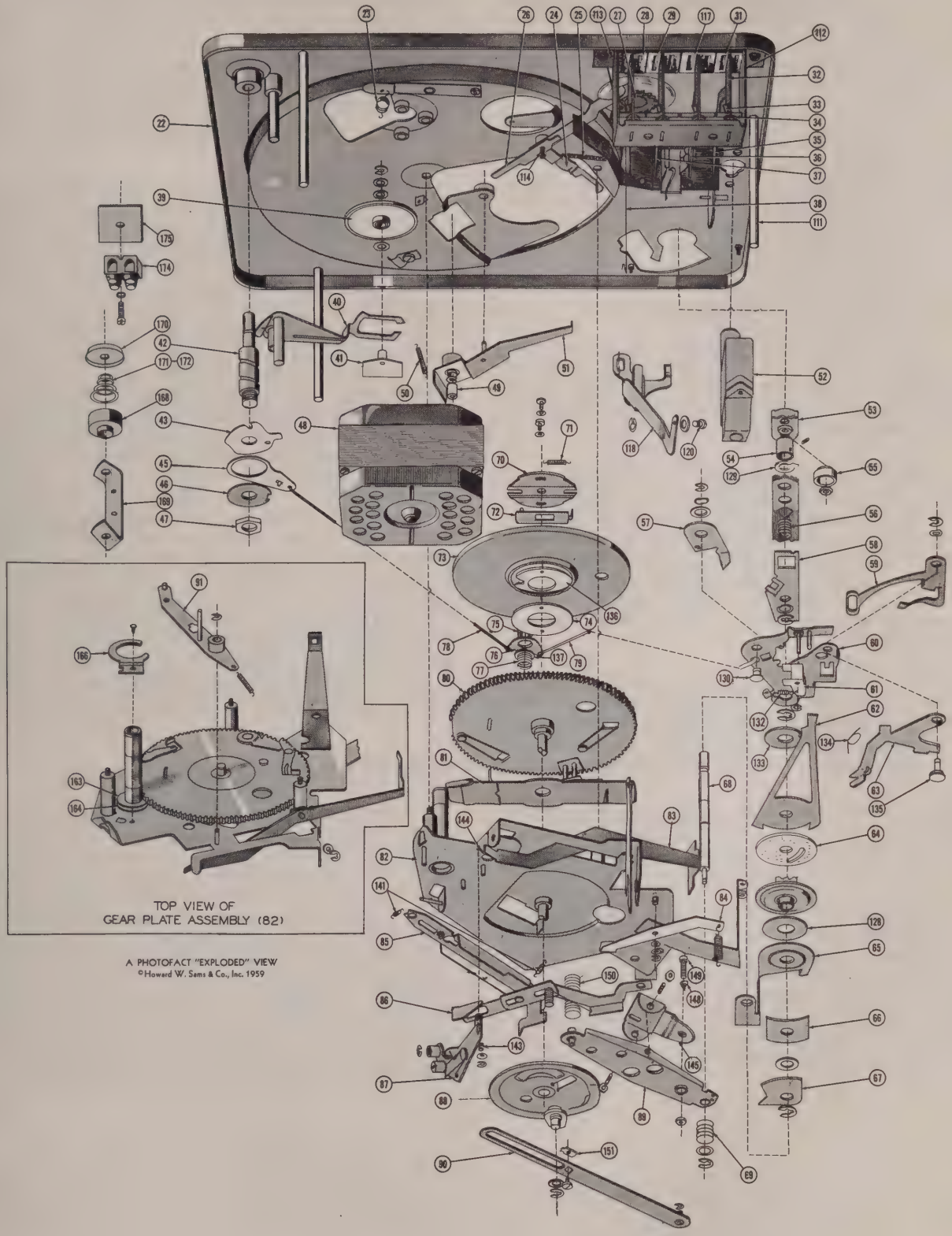


FIG. 5A EXPLODED VIEW OF PARTS ABOVE BASEPLATE



A PHOTOFACT "EXPLODED" VIEW
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FIG. 5B EXPLODED VIEW OF PARTS BELOW BASEPLATE

When the tone arm has reached its farthest outward travel, cam disc (88), because of its contour, contacts and moves spindle actuating lever (85) forward far enough to engage the bottom of record spindle (1). The adjustment screw on the rear of spindle actuating lever (85) rides up the inclined cam surface on cam disc (88), pivots the front of spindle actuating lever (85) downward, and actuates record spindle (1). The bottom record of a stack, resting on the record spindle, is dropped to the turntable.

The tone arm adjusts itself to the size records being changed by stop dog plate (60), which has two levers. One lever is the 7-inch slide lever (57), which controls the 7-inch and 10-inch setdown positions. The other lever is the 12-inch stop dog (63), which controls the 12-inch setdown position. Seven-inch slide lever (57) is moved into position for 7-inch records by rod (78) and 7-inch setdown rod (79) when the speed control knob is placed in the 45-rpm position.

Tracer lever (58) is coupled directly to the tone arm support mechanism and, therefore, moves in unison with the tone arm. Tracer lever (58) directs the inward movement of the tone arm to one of the three setdown positions.

When 7-inch records are being changed and the changer is in the 45-rpm position, the turned-down nose on tracer lever (58) slides up the incline and over the top of 7-inch slide lever (57). After sliding over the top of 7-inch slide lever (57), the turned-down nose on trace lever (58) drops into a square hole in stop dog plate (60). The inward travel on the tone arm is stopped with the stylus directly over the lead-in groove of the 7-inch record.

When 10-inch records are being changed and the changer is in the 33 1/3 or 78-rpm position, 7-inch slide lever (57) is pivoted toward the front of the changer. Consequently, tracer lever (58) fails to contact 7-inch slide lever (57) as the tone arm moves inward.

The turned-down nose on tracer lever (58) moves behind 7-inch slide lever (57) and rests against stop dog plate (60). The stylus is positioned directly over the lead-in groove of a 10-inch record.

When a 12-inch record drops to the turntable, the record strikes scanning lever (15A). Scanning lever (15A) pushes 12-inch stop dog (63) in front of the turned-down nose on tracer lever (58). As the tone arm moves inward toward the record, the turned-down nose on tracer lever (58) rests against 12-inch stop dog (63). The inward movement of the tone arm is stopped, and the stylus is positioned directly over the lead-in groove of a 12-inch record.

At this time, tone arm control lever (89) rides down the cam surface on outer edge of cam disc (88) and lowers the tone arm onto the record. This same action raises tracer lever (58) out of engagement with the setdown stop dog, and the tone arm can ride freely across the record.

Cogwheel (80) and cam disc (88) have now completed their rotation, and the open gap in the cogwheel teeth faces the pinion gear on the turntable hub. This phase of the change cycle is now completed.

As the stylus moves across the record, weighed segment (62) moves inward with the tone arm through a friction clutch arrangement. As the tone arm nears the end of a record, weighted segment (62) strikes cycle starting catch (81) and moves it until the rubber bumper on its end moves within .016 inch from the turntable hub. At this time, weighted segment (62) also contacts recoil lever (20). The pin nearest the hub underneath the turntable strikes recoil lever (20) on each revolution of the turntable. Recoil lever (20) strikes and moves weighted segment (62) away from cycle starting catch (81). This action takes place during each revolution of the turntable until the stylus reaches the end of a record. At this time the stylus enters the lead-out groove of the record, and the tone arm accelerates rapidly. This rapid acceleration causes weighted segment (62) to move far enough and fast enough to push cycle starting catch (81) and its rubber bumper into contact with the lower driving surface on the turntable hub. Contact between the rubber bumper on cycle starting catch (81) and the turntable hub gives the necessary push for the teeth in cogwheel (80) to engage the teeth on the turntable hub. Thus, a new cycle is started. The mechanism again follows the preceding sequence of cycling and playing until the last record of the stack has been played.

Automatic Shutoff

When the last record drops, the three expanding fingers at the top of the record spindle are not restrained by the center hole of the record. This action allows the wire at the bottom of the record spindle to be pulled down farther than it would normally go when records are on the spindle. The downward movement of the wire on the bottom of the record spindle is transmitted to ratchet lever (61) by the action of switchoff lever (83) and shutoff lever (87). When the tone arm swings out, ratchet lever (61) engages the notch in front of tracer lever (58) and prevents the tone arm from moving in over the turntable. At this time, cam disc (88) completes its revolution and lowers the tone arm onto its rest; and line switch (52) is disconnected.

ADJUSTMENTS

Needle Pressure

Needle pressure depends upon the cartridge used and is measured on the level of the first record at the needle. The pressure must not be less than 6 grams.

Needle pressure adjusting nut (12) regulates the needle pressure. Turning needle pressure adjusting nut (12) clockwise decreases the pressure; turning it counterclockwise increases the pressure.

Tone Arm Height

The height the tone arm will rise during the change cycle is adjusted by height adjustment screw (9). To adjust the tone arm height, cycle the changer by hand until the tone arm is over the turntable. While the tone arm is at its maximum height, turn height adjustment screw (9) until the needle point lies one inch above the rubber turntable mat. After this adjustment is completed, check to see whether the tone arm lands low enough to play a thin record. If it doesn't, lower the height slightly.

Needle Setdown

The tone arm landing point is adjusted for all sizes of records by adjusting for one size of record. The tone arm is turned by turning knurled setdown adjustment nut (55) for the proper setdown.

Tone Arm Brake

When the tone arm is in the playing position, a small gap should be seen between brake segment (67) and brake adjustment screw (89A). This gap allows the tone arm to move freely across a record. The gap is adjusted by turning brake adjustment screw (89).

Idler Wheel Height

Place the speed control knob in the "O" position and remove the turntable. Make sure idler wheel (39) is horizontal and its height is correct. The bottom edge of the idler wheel tire must not be sliding onto the next step of the motor pulley. Adjust the idler wheel height by loosening hex head nut (47) and turning speed cam worm (42). Tighten hex head nut (47); if necessary, set the speed control knob so that its numerals face the triangular mark on the baseplate.

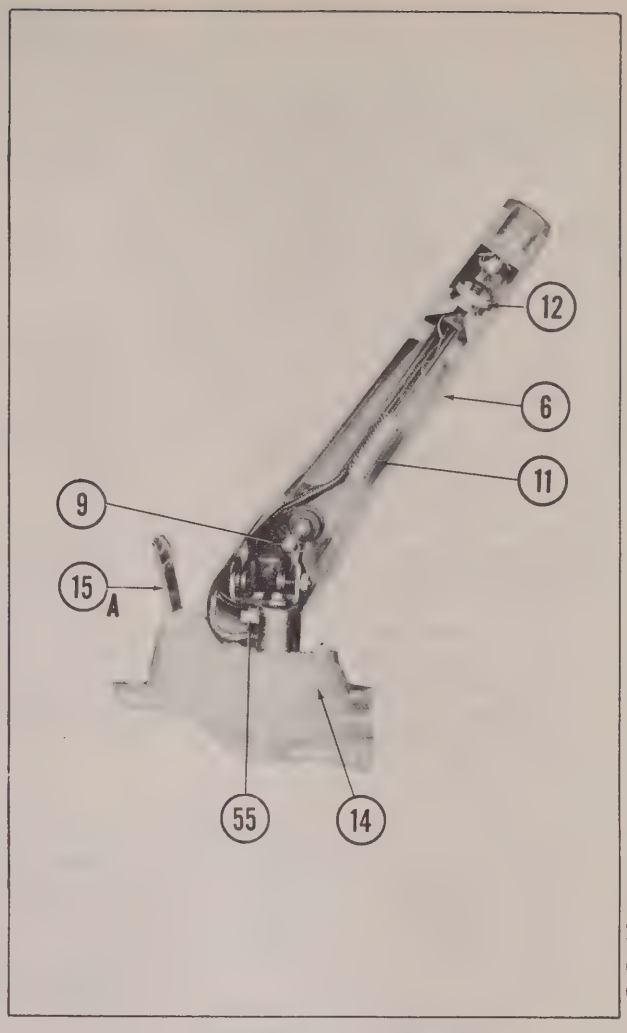

FIG. 6 UNDERSIDE OF TONE ARM

CLEANING

If the levers become noisy or the sliding members become sluggish, clean them with a petroleum solvent. Then lubricate, as described in the following paragraph under "Lubrication."

LUBRICATION

Under normal operation, the original lubrication should last for a long time. If the changer is operated continuously for long periods of time and the mechanism becomes noisy, or if the levers and sliding members respond sluggishly, lubricate as follows:

With SAE #10 Motor Oil

1. One drop at the pivot points of all levers which seem to operate sluggishly.
2. One drop on the top and bottom felt pads of the motor.

With Ball Bearing Grease

1. Apply a thin coat on the sliding surfaces of sluggish sliding lever members.

CAUTION: Do not allow any oil or grease to fall on the inside rim of the turntable, the step motor pulley, idler wheel (39) tire, or pause drive (49). If any grease or oil should fall on these parts, clean them with a petroleum solvent.

TROUBLE CHART

Symptom	Cause	Remedy
Tone arm lands in the wrong spot.	1. Controlling elements not free to move.	1. With the aid of a template, check the cutout in the wooden mounting base; also check the position of the drilled holes. Place the connecting wires so they do not contact the drive elements.
	2. Tone arm dislocated during shipment.	2. See "Tone Arm Setdown" under "Adjustments."
Changer does not trip when needle reaches end of record.	1. Weighted segment (62) cannot overcome force of recoil lever (20).	1. Remove turntable and recoil lever(20). Lubricate recoil lever (20) bearing with one drop of light oil.
Changer trips before tone arm reaches end of record.	1. Record center hole too large. 2. Felt washer (64) dirty; causes weighted segment(62)to bind.	1. Discard record. 2. Clean or replace felt washer (64).
Tone arm lands in 10-inch position when 7-inch records are being played; or in 7-inch position when 10-inch records are being played.	1. Rod connecting lever (76)hangs up on mounting base. 2. Rod (78) or 7-inch setdown rod (79) bent.	1. Check cutout in base; widen if necessary. 2. Bend rod (78) or 7-inch setdown rod (79) so that 7-inch slide lever (57) is in proper position when 7-inch records are being played.
Tone arm lands in 10-inch position when 12-inch records are being played.	1. Twelve-inch stop dog(63)binds on stop dog plate (60).	1. Clean or replace 12-inch stop dog (63).
Record does not stop.	1. Record spindle stroke too small.	1. To lengthen spindle stroke, adjust the screw on the rear of spindle actuating lever (85).
	2. Record spindle jams.	2. Replace the record spindle.
	3. Repeat bar (86) jams.	3. Clean foreign matter from repeat bar (86) and oil the pivot points.
Poor reproduction.	1. Record slips because it is warped.	1. Discard record.
	2. Defective pickup cartridge or stylus.	2. Replace cartridge or stylus.
	3. Turntable binds.	3. Remove turntable. Clean hub and shaft. Lubricate inside of turntable hub with light oil. Keep outside surface of turntable hub free from oil.
Rumble when turntable revolves.	1. Idler wheel (39) tire dirty.	1. Remove turntable. Clean idler wheel (39) tire, motor pulley, and inside of turntable rim with a petroleum solvent.
	2. Idler wheel (39) dented.	2. Replace idler wheel (39).
Changer does not shut off after last record has been played.	1. Wire on bottom of record spindle does not actuate switchoff lever (83) and shutoff lever (87).	1. Adjust eccentric screw on end of shutoff lever (87) so that wire on bottom of the record spindle actuates switchoff lever (83) and shutoff lever (87).
	2. Protruding wire at bottom of record spindle broken.	2. Replace record spindle.
	3. Line switch (52) defective.	3. Replace line switch (52).

TROUBLE CHART (CON'T.)

Symptom	Cause	Remedy
Changer shuts off before all records have dropped from record spindle.	1. Eccentric screw on end of shut-off lever (87) improperly adjusted.	1. Adjust eccentric screw on end of shutoff lever (87) so that switchoff lever (83) and shutoff lever (87) are actuated by the wire on the bottom of the record spindle only when the last record of a stack drops onto the turntable.
Turntable does not revolve when Start button is depressed.	1. No current at motor. 2. Defective line switch (52). 3. Motor defective.	1. Check to see whether current is reaching AC leads of changer. 2. Replace line switch (52). 3. Remove turntable and allow motor to operate without a load. If current is reaching the motor but the motor shaft does not rotate, the motor is defective and should be repaired or replaces. Also, all wiring and soldered terminals in the changer should be checked.
Tone arm does not track properly.	1. Incorrect stylus pressure. 2. Record worn; stylus jumps from the grooves.	1. Stylus pressure should not be less than 6 grams. 2. Discard record.
Changer shuts off before end of record.	1. Recoil lever (20) bent.	1. Adjust recoil lever (20) by bending with fingers.
Wow.	1. Slippage due to warped records.	1. Discard records.
Excessive hum.	1. Changer installed directly above amplifier chassis. 2. Jack making poor connection.	1. Relocate changer so there is no chance of amplifier picking up hum from motor. 2. Resolder jack. Be sure it fits properly in plug on amplifier.
Turntable does not move freely.	1. Foreign matter in center hole of turntable.	1. Remove turntable. Clean center hole and apply a thin coat of oil on inside of hole.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	10-024B	Record Spindle SA7B
2	10-028	Single-Play Spindle
2A	10-038-173	45 rpm Adapter
3	10-038-143	Rubber Mat
4	10-038U79	Turntable
5	10-038U87	Tone Arm Bracket
6	10-102E	Pickup Arm
7	10-101T	Plug-in Head
8	10-038-78	Tone Arm Mtg. Brkt. Bridge
9	10-027-189	Height Adjustment Screw
10	10-038U8	Tone Arm Bracket
11	10-038-26	Tension Spring

Ref. No.	Part No.	Description
12	10-038-29	Needle Pressure Adj. Nut
13	10-038-28	Headless Screw
14	10-038-U83	Scanning Lever Housing
15	10-027-82	Helical Twist Spring
15A		Scanning Lever
16	10-027-84	Leveling Piece
17	10-038-164	Speed Control Knob
18	10-027U6	Rubber Cogwheel
19	90-182A	Voltage Selector
20	10-027U7	Recoil Lever
21	10-038-51	Rubber Gasket for Suspension of Motor Chassis

Ref. No.	Part No.	Description
22	10-038U80	Baseplate
23	10-016-36	Tension Spring
24	10-038-86	Switch Lever
25	10-038-73	Tension Spring
26	10-038-10	Pause Gap Actuating Lever
27	10-038-U81	Ratchet Wheel and Scale
28	10-038-155	Repeat Button
29	10-038-156	Pause Button
30	10-038-166	Filter Button
31	10-038-158	Start Button
32	10-027-284	Lever
33	10-027U12	Angular Lever
34	10-027-57	Compression Spring
35	10-027U95	Lever
36	10-027U83	Insulating Bar
37	10-027U15	Lever
38	10-027-215	Rod
39	10-038U73	Idler Wheel
40	10-038U71	Idler Pivot Lever
41	10-038U72	Idler Wheel Mtg. Plate
42	10-027-341	Speed Cam Worm
43	10-038-108	Speed Change Cam
45	10-038-109	Eccentric
46	10-038-114	Washer
47		Hex Head Nut
48	10-036D	Motor
49	10-027-40	Pause Drive Ring
50	10-012-40	Tension Spring
51	10-038U5	Pause Drive Axle Lever
52	10-038U85	Line Switch
53	10-038U7	Tone Arm Support
54	10-038-55	Setting Ring
55	10-038-23	Knurled Set down Adj. Nut
56	1-02301-144	Compression Spring
57	10-027-211	7" Slide Lever

Ref. No.	Part No.	Description
58	10-027U47	Tracer Lever
59	10-027-207	Repeat Lever
60	10-027U44	Stop Dog Plate
61	10-027-213	Ratchet Lever
62	10-027U22	Weighted Segment
63	10-027-210	12" Stop Dog
64	10-016-14	Felt Washer
65	10-027-92	Tone Arm Actuating Lever
66	10-027-93	Spring Washer
67	10-027-72	Brake Segment
68	10-038-16	Tone Arm Support Rod
69	10-025-22	Compression Spring
70	10-027-141	Guide Disc
71	10-038-72	Slide Piece Tension Spring
72	10-027U33	Slide Piece
73	10-038-84	Interval Disc
74	10-027-125	Triazetatfolie
75	10-027-221	Spacer
76	10-027-220	Rod Connecting Lever
77	10-027-236	Compression Spring
78	10-038U74	Rod
79	10-027-223	7" Set down Rod
80		Cogwheel
81		Cycle Starting Catch
82		Gear Plate
83	10-027-265	Switchoff Lever
84	10-038-14	Start Lever
85	10-027U35	Spindle Actuating Lever
86	10-027U38	Repeat Bar
87	10-027U64	Shutoff Lever
88		Cam Disc
89	10-027U90	Tone Arm Control Lever
90	10-027U41	Tone Arm Coupling Rod
91	10-038U20	Pause Gap Actuating Lever

Ref. No.	Part No.	Part Of Ref. No.	Description
103	10-027-101	4	Benzing Type Washer
104	10-038-24		Spring Washer
105	10-038-17	10	Pivot
106	10-038-54		Shouldered Screw
107	10-038-71		Washer
109	10-027-39	18	Rubber Cogwheel
110	10-027-44	20	Felt Washer
111	10-054-2		Support
112	10-027-266	22	Bracket
113	10-027-62		Leaf Spring
114	10-027-30	26	Compression Spring
117	10-038-157	30	Stop Button
118	10-027-U107		Stop Bar
120	10-027-61	33	Bolt
128	10-027-94	53	Cardboard Washer
129	10-038-56	54	Washer
130	10-027-61	57	Bolt
132	10-027-214	61	Tension Spring
133	10-027-91	62	Washer
134	10-027-212	63	Spring
135	10-027-209		Bolt
136	10-027-136	74	Ring

Ref. No.	Part No.	Part Of Ref. No.	Description
137	10-027-237	76	Washer
141	10-027-153	85	Tension Spring
143	10-027-137	86	Compression Spring
144	10-027-164	87	Ring Spring
145	10-027U91		Support for Rocker
148	10-027-326	89	Compression Spring
149	10-027-325		Brake Bolt
150	10-027-173		Compression Spring
151	10-027-177	90	Slider
163	10-038-163		Ball Bearing Race
164	10-027-102	82	Cage for Ball Bearing
166	10-038-162		Bracket
168	10-031-42		Cup
169	10-026-2	Parts	Clamp
170	10-031-43	needed for	Tray
171	10-027-286	installation	Truncated Cone Spring (blue)
172	10-027-287		Truncated Cone Spring (Nickel-Plated)
174	Erk777	Electrical	Bakelite Connector
175	10-027-183	accessories	Insulating Plate

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MOTOROLA MODELS 5T11G, M, R, W (Ch. HS-652)

MOTOROLA MODELS 5T11G, M, R, W (Ch. HS-652)

MODEL 5T11M

MOTOROLA MODELS 5T11G, M, R, W (Ch. HS-652)

TRADE NAME	Motorola Models 5T11G, 5T11M, 5T11R, 5T11W (CH. HS-652)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC-DC Operated 5 Tube AM Receiver
POWER SUPPLY	110 - 120 Volts AC-DC
RATING	28 Watts, .29 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	535 - 1620KC

NOTE: TUNING KNOB IS CAPTIVE AND REMAINS WITH CABINET.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A4.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd.	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	600KC	Tune to 600KC signal	"	A6	Radio should be in cabinet. Adjust for maximum output by moving ring to the right or left on Ferrite rod.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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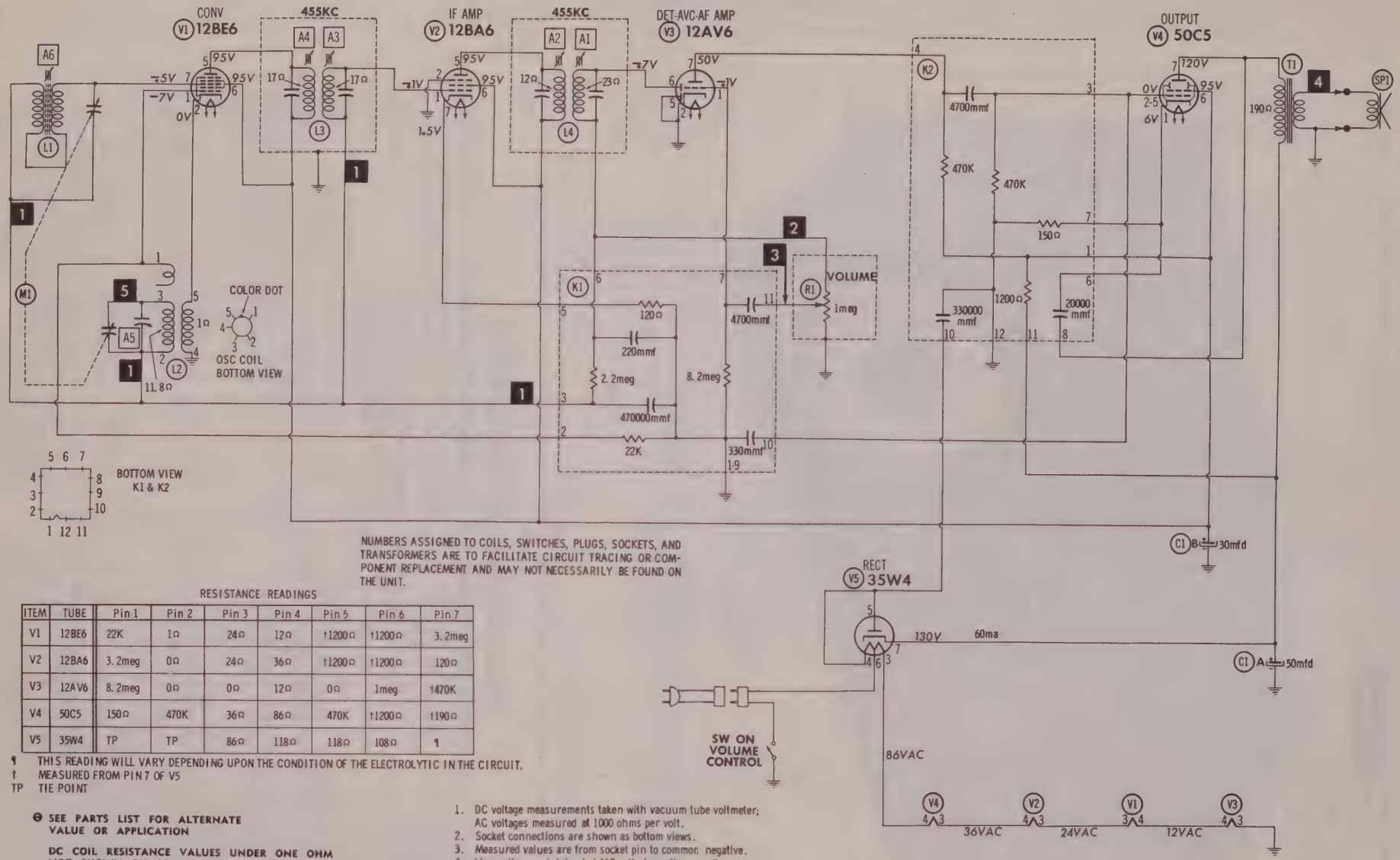
SET 444 FOLDER 13



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	24Ω	12Ω	†1200Ω	†1200Ω	3.2meg
V2	12BA6	3.2meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	120Ω
V3	12AV6	8.2meg	0Ω	0Ω	12Ω	0Ω	1meg	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1200Ω	†190Ω
V5	35W4	TP	TP	86Ω	118Ω	118Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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MOTOROLA MODELS 5T11G, M, R, W (Ch. HS-652)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	50	150	23B632015	AFH2-15-05	BBRD5315	PFP213.1	TDLD-8	PCL-2432	
B	30	150							

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1meg	½	18K640847					Volume & Switch

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Det-AVC-AF Amp.	220mmf, 330mmf, 4700mmf, 470000mmf, 120Ω, 22K, 2.2meg 8.2meg	51C637000	
K2	Audio Couplate	4700mmf, 20000mmf, 330000mmf 150Ω, 1200Ω, 470K, 470K	51K637001	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	24K640837					Includes Cabinet Back
L2	Osc. Coil	24B637228					
L3	Input IF	24K636016	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	24K636017	16-6780	BC-357	13-PC10	RF-4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	25B632025	Z1101①	A-3025①	AU-605①	A-3332①	26S58①	S-12X①	① Use original channel frame

PRINTED BOARD

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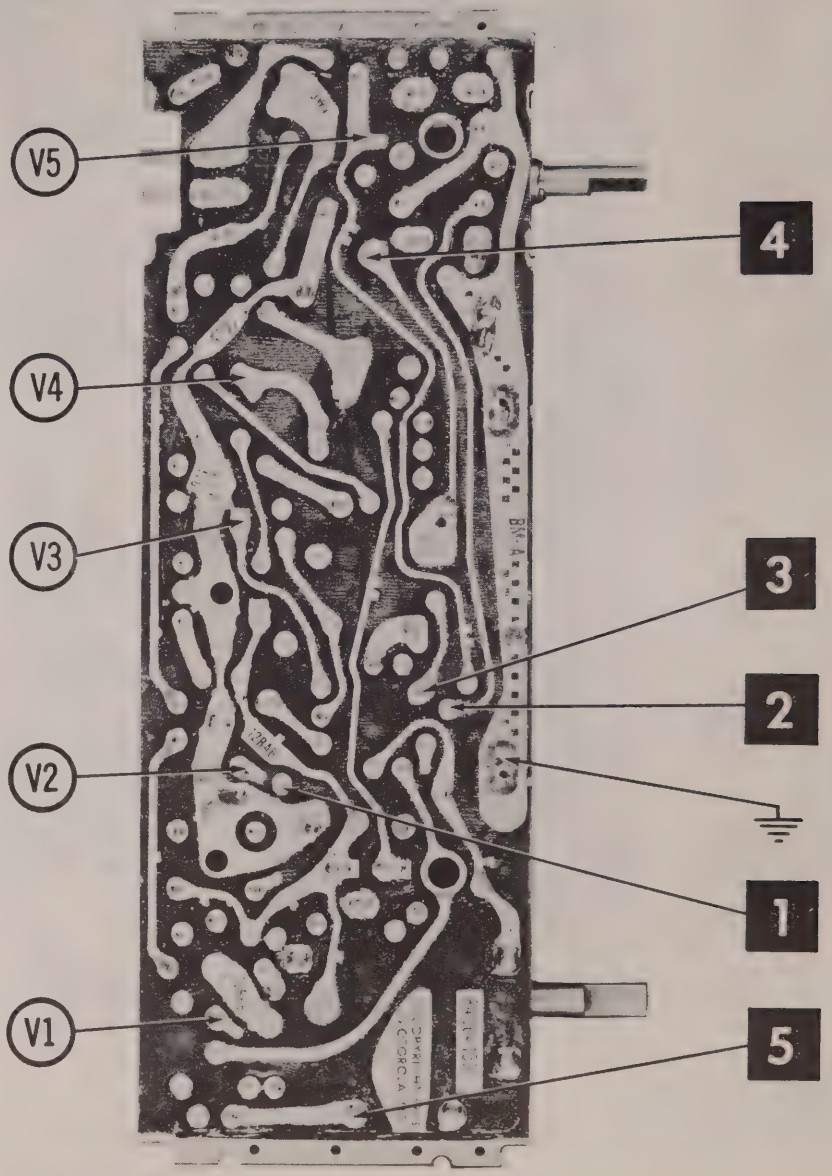
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	50K637637	4A1	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap. Printed Board	19K640823 1V641086	2 Gang (Less All Components) Includes AC Contacts And #84C641535 Plated Panel Board

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

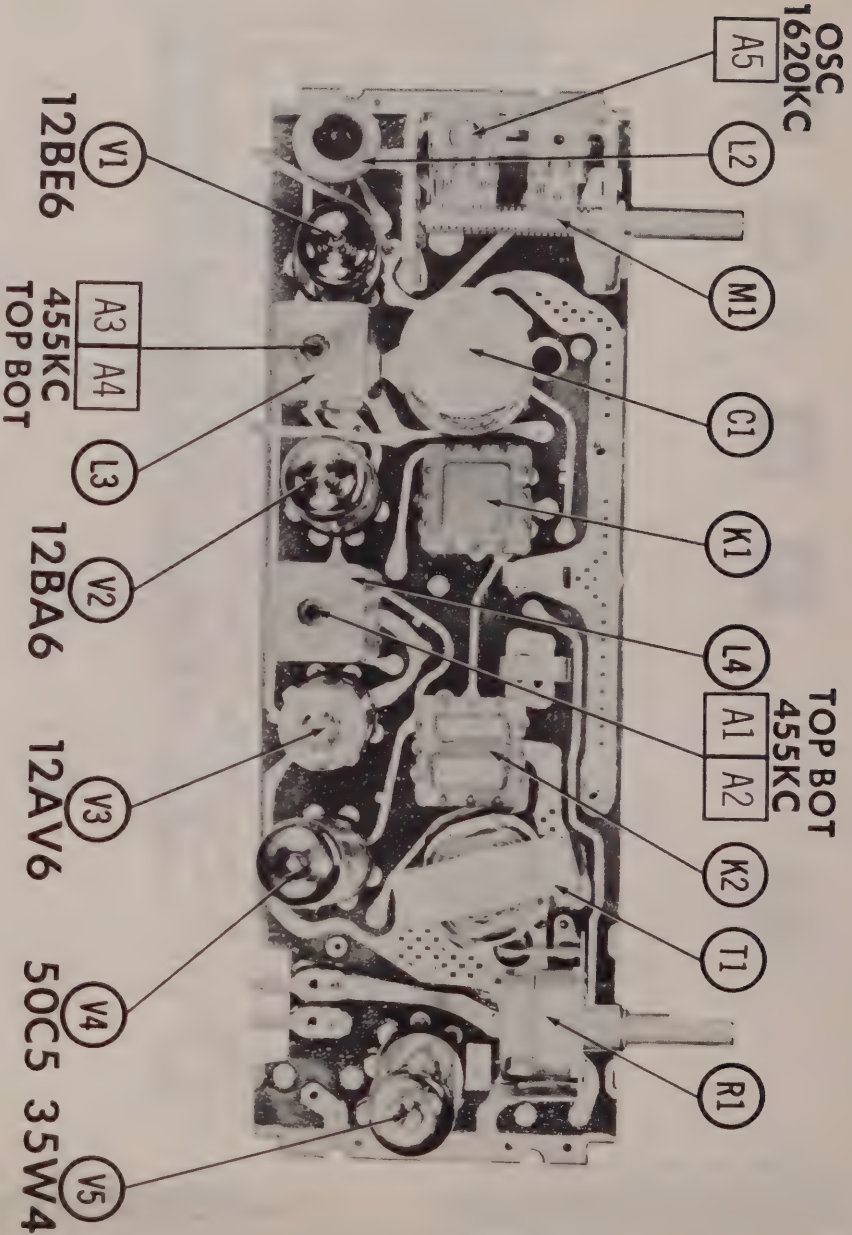
NAME	PART NO.	DESCRIPTION
Knob	36C640964	Tuning, Model 5T11M
Knob	36K640966	Tuning, Model 5T11G
Knob	36K640967	Tuning, Model 5T11R
Knob	36K640965	Tuning, Model 5T11W
Knob	36B640939	Volume-On-Off, Model 5T11M
Knob	36K640973	Volume-On-Off, Model 5T11G
Knob	36K640974	Volume-On-Off, Model 5T11R
Knob	36K640972	Volume-On-Off, Model 5T11W
Cabinet	1V641094	Mahogany, Model 5T11M
Cabinet	1V641095	Green, Model 5T11G
Cabinet	1V641096	Red, Model 5T11R
Cabinet	1V641097	Antique White, Model 5T11W

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—TOP VIEW



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MOTOROLA MODELS 6X28B, N, P, W (Ch. HS-638)

MOTOROLA MODELS
6X28B, N, P, W (Ch. HS-638)

MODEL 6X28N

TRADE NAME	Motorola Models 6X28B, 6X28N, 6X28P, 6X28W (CH. HS-638)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
RATING	9.8MA@6 Volts DC (No Signal, Min. Volume) 18MA@6 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 - 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A2, A3..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728
WALSCO #2515, 2531, 2532

A4, A6..... GENERAL CEMENT #5000, 5003, 5009, 8290
WALSCO #2515, 2520, 2523, 2525, 2537

A5..... GENERAL CEMENT #8282, 8606, 8606L, 9089, 9091
WALSCO #2526, 2541, 2542, 2543, 2544

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to antenna stator of tuning gang. (White lead of loopstick). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across speaker leads	A1, A2, A3	Adjust for maximum output. If regeneration is encountered when adjusting A3, back out core above top of can. Adjust A3 for maximum output.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal	"	A5	"
4.		"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat steps 2, 3, & 4.

DISASSEMBLY

1. Insert coin in cover slot and twist to remove cabinet back.
2. Remove earphone jack mounting nut and washer.
3. Remove batteries. Remove battery contact panels by pulling straight out. (Note rounded corners to insure proper reinsertion.)
4. Spread cabinet at top and bottom to free mounting tabs. Lift chassis at speaker end to clear top and bottom tabs.
5. Lift chassis and slide over speaker to free chassis from mounting tabs below earphone jack.
6. Loosen speaker bracket mounting screws so that speaker can be removed.
7. Lift chassis, speaker and battery contact panels from cabinet.
8. When reinstalling, mount speaker first, then put tuning gang end of chassis in cabinet. Spread cabinet top and bottom and place chassis under top and bottom mounting tabs. Dress battery leads away from antenna. Replace battery contact panels.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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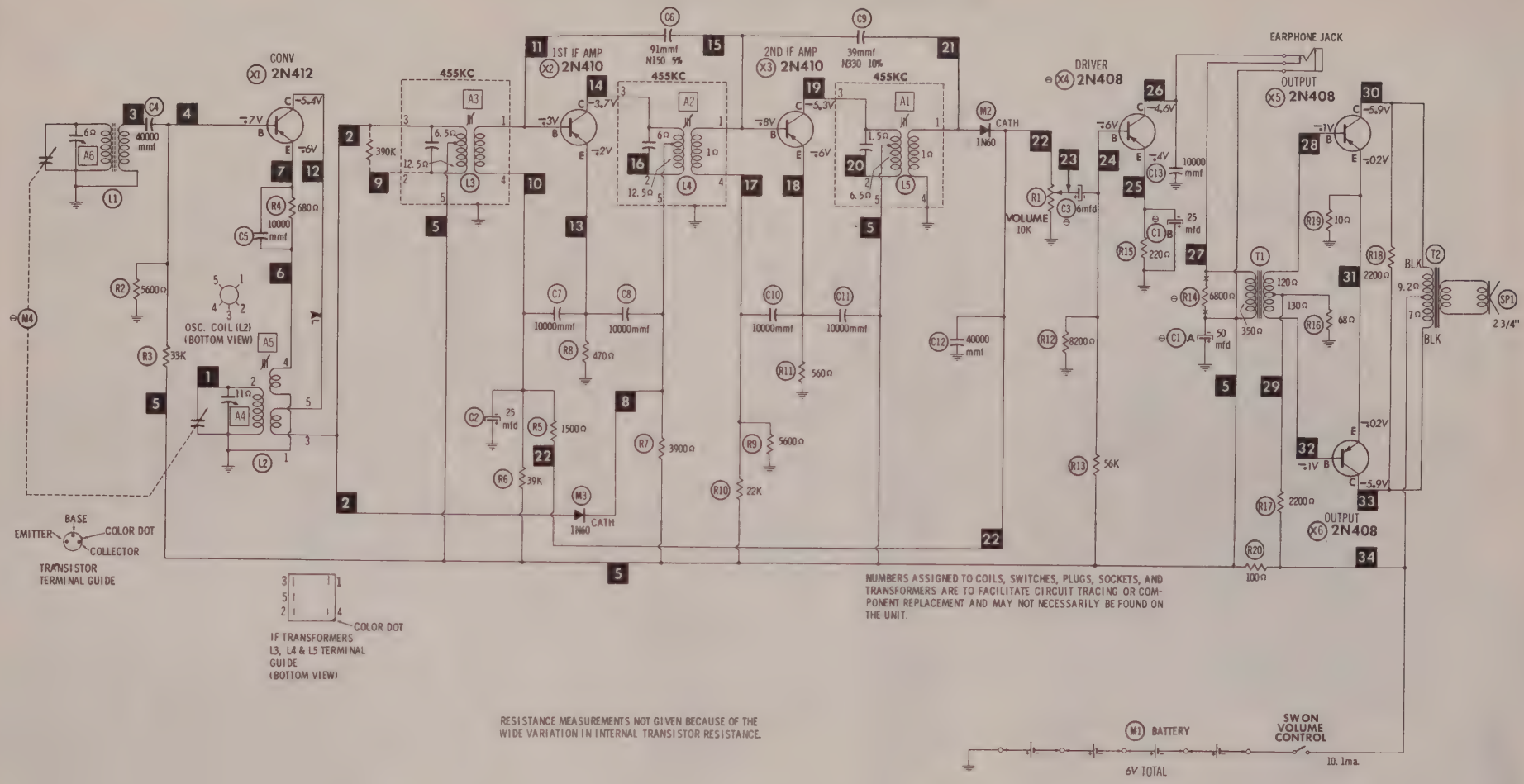
H933

SET 444 FOLDER 14



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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MOTOROLA MODELS
6X28B, N, P, W (Ch. HS-638)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N412	Converter		2N412	2N486	2N412	PNP
X2	2N410	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2N410	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2N408 *	Driver		2N408		2N408	PNP
X5	2N408	Output		2N408	2N633	2N408	PNP \ Matched Pair
X6	2N408	Output		2N408	2N633	2N408	PNP /

* Some versions may use 2N362, 2N591, or 2N591-6M in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	50	10	23B639917					VLS-2245*	①
B	25	10							①
C2	25	3	23K637758	XPP-3025	NL25-3	TT3X25	ML25-3	TE-1055	
C3	6	10	23K636769	XPP-10006	NL6-25	TT12X5	ML6-15	TE-1127.1	②

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Some versions may use separate units, C1A Part #23K637758, C1B (3V) Part #23K635407.
② Some versions may use 80000mmf in this application. When used R14 is omitted.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	40000			21B635399			BYB6S4			
C5	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C6	91		N150 5%	21R128601						
C7	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C8	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C9	39		N330 10%	21R128600						
C10	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C11	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C12	40000			21B635399			BYB6S4			
C13	10000			21K640366	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	1/4	18B640094					Volume & Switch

RESISTORS

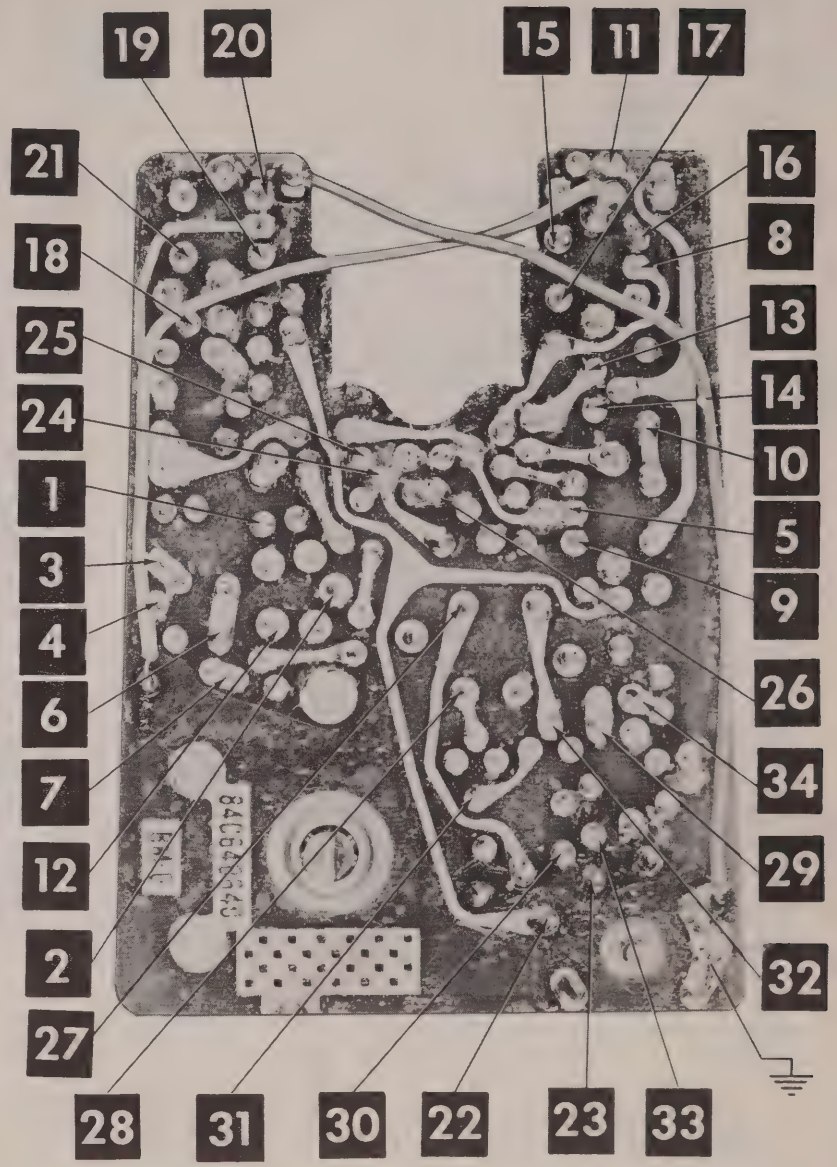
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R2	5600Ω		6K127005	
R3	33K		6K127632	
R4	680Ω		6R6040	
R5	1500Ω		6K127513	
R6	39K		6K125535	
R7	3900Ω		6K121931	
R8	470Ω		6K127633	
R9	5600Ω		6K127005	
R10	22K		6K119935	
R11	560Ω		6K122802	
R12	8200Ω		6K119931	
R13	56K		6K127541	
R14	6800Ω		6K119930	Note 1
R15	220Ω		6K127099	
R16	68Ω		6R2039	
R17	2200Ω		6R6069	
R18	2200Ω		6R6069	
R19	10Ω		6K124668	
R20	100Ω		6R6326	

Note 1. When C3 is 80000mmf, R14 is omitted.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	24C640351					
L2	Osc. Coil	24C640352					
L3	1st IF	24K640365					
L4	2nd IF	24C640364					
L5	3rd IF	24K640389					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	: 1	25K640349						

SPEAKER

ITEM No.	TYPE		REPLACEMENT DATA		NOTES
	SIZE	IMPEDANCE	MOTOROLA PART No.	QUAM PART No.	
SP1	2 3/4"	230Ω CT @ 400~	50B639916		Magnetic Type

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			Z①		1015 ① E9 ②		M-15R① ZM9②	① 4 Used ② Mercury Type, 4 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MOTOROLA PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N60	48K640754	1N60	1N295	Detector (Pigtail)
M3	1N60	48K640754	1N60	1N295	Overload (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Tuning Cap.	19B640095	2 Gang (Replaces 3-stud mounted unit #19K642741)
	Printed Board	84C640640	Less All Components (Specify Letter Suffix and Model Number of Receiver)

CABINETS & CABINET PARTS

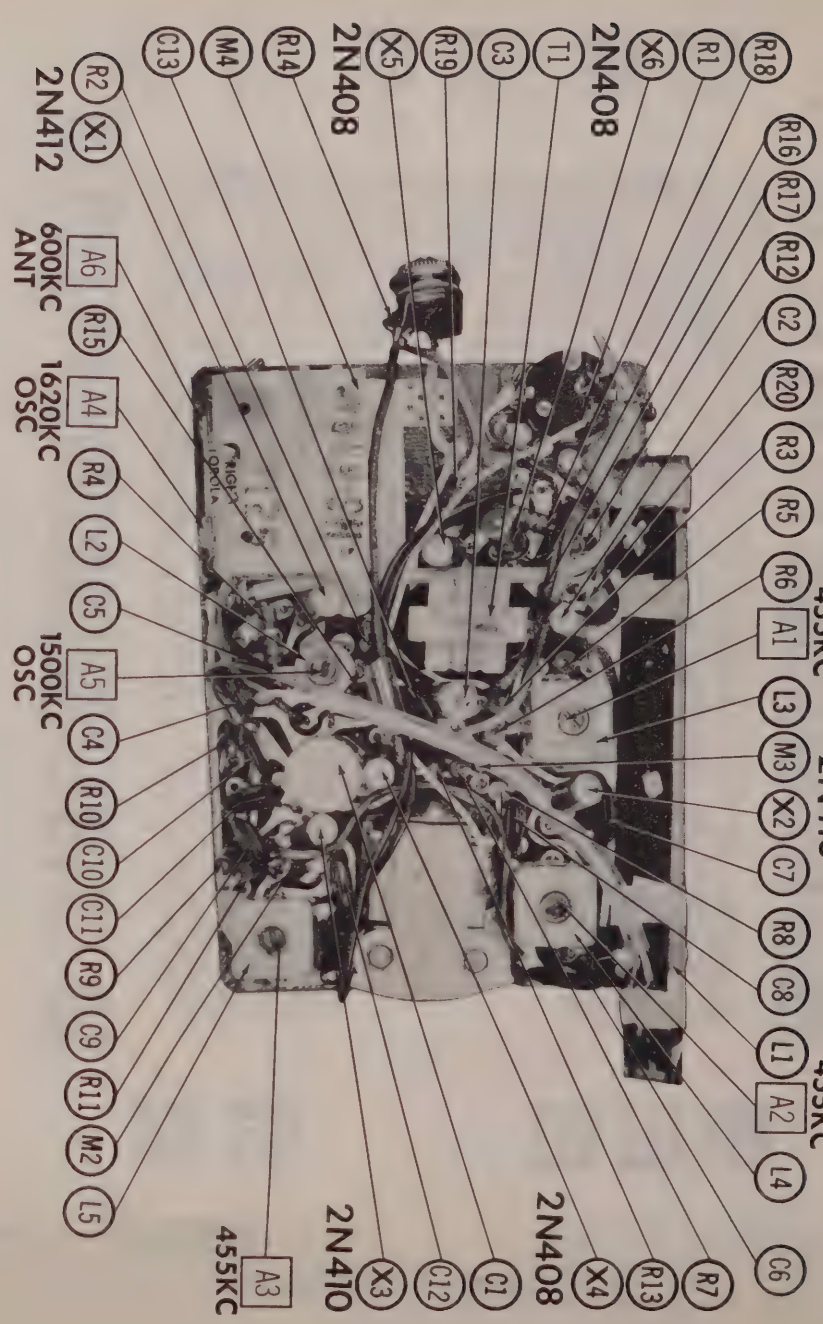
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36C640090	Tuning
Knob	36B640091	Volume, On-Off
Cabinet Front	1V642022	Mocha, Includes Dial Crystal, Model 6X28N
Cabinet Front	1V642024	Pink, Includes Dial Crystal, Model 6X28P
Cabinet Front	1V642026	Antique White, Includes Dial Crystal, Model 6X28W
Cabinet Front	1V642020	Blue, Includes Dial Crystal, Model 6X28B
Cabinet Back	1V642023	Mocha, Model 6X28N
Cabinet Back	1V642021	Blue, Model 6X28B
Cabinet Back	1V642025	Pink, Model 6X28P
Cabinet Back	1V642027	Antique White, Model 6X28W
Dial Crystal	61B640267	(Part #11M128076 Adhesive May be Used)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



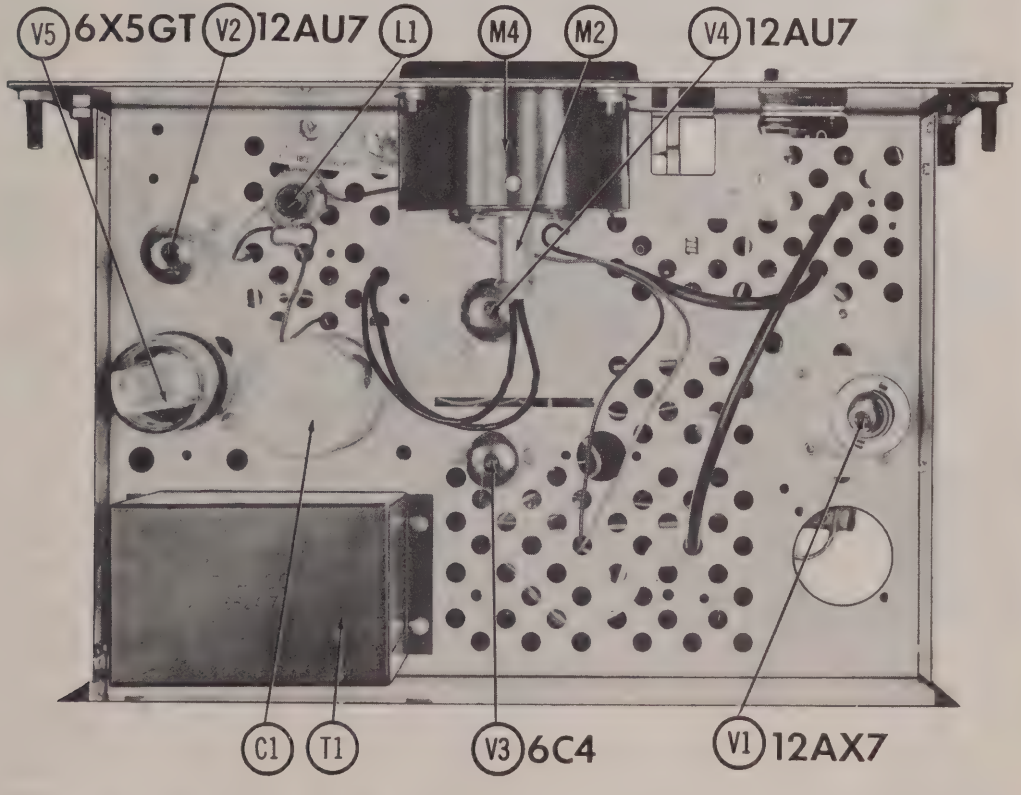
PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PENTRON MODEL CA-13

PENTRON
MODEL CA-13

TRADE NAME	Pentron Model CA-13
MANUFACTURER	Pentron Corp., 777 S. Tripp Ave., Chicago 24, Illinois
TYPE SET	AC Operated 5 Tube Record - Playback Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 21 Watts, .22 Amp. @117 Volts AC (Playback) 29 Watts, .29 Amp. @117 Volts AC (Record)



PENTRON
MODEL CA-13

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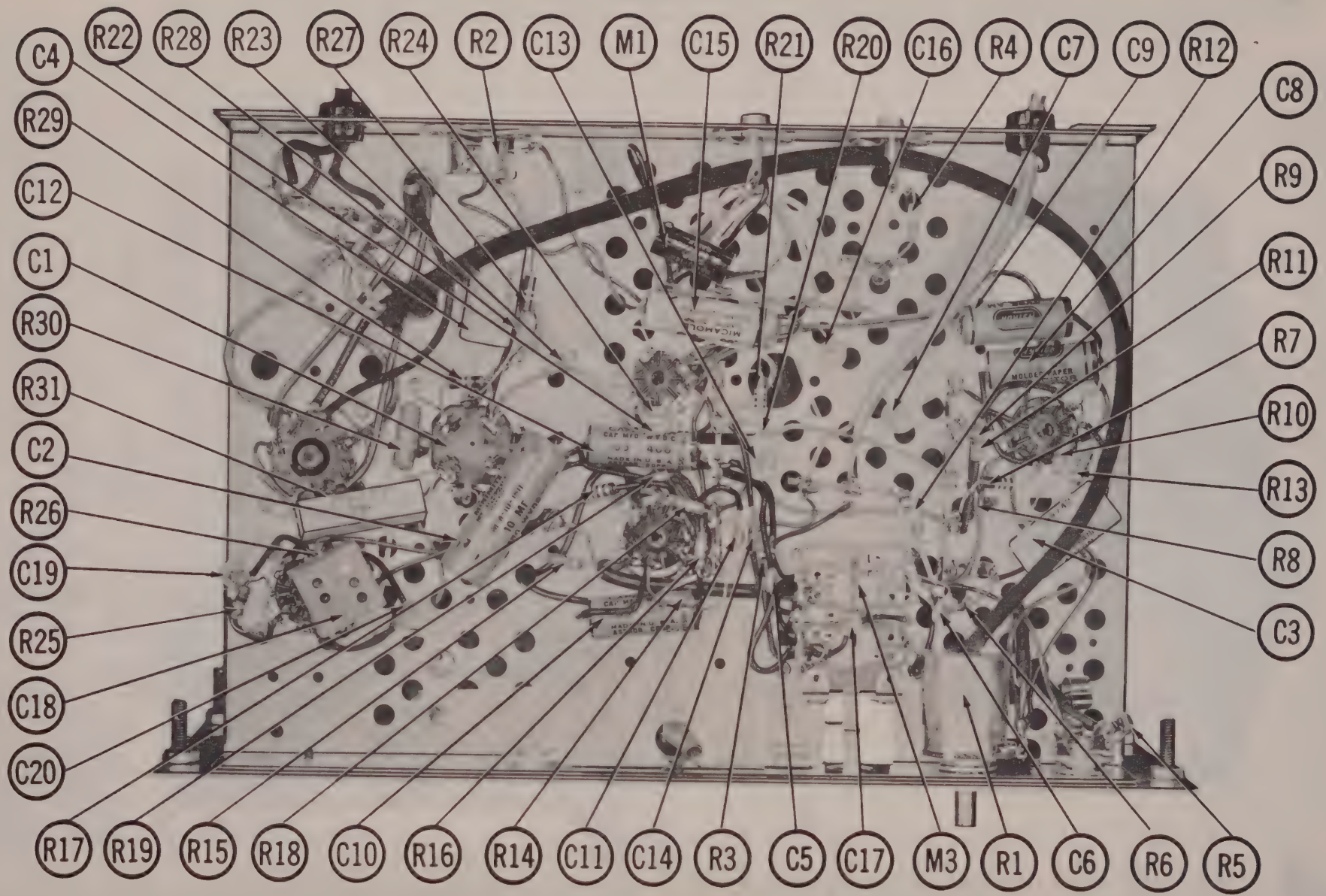
H977

SET 444 FOLDER 15



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st AF Amplifier	12AX7	①
V2	2nd AF Amplifier	12AU7	
V3	Meter Amplifier	6C4	
V4	Bias Oscillator	12AU7	
V5	Rectifier	6X5GT	

① Some versions may use ECC83/12AX7 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	PENTRON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲40	450		AFH4-18-10	D0171	FP446	TMT-36	TVL-4771. 8	
B	■30	450					TD-30-450		
C	▲10	350							
D	10	350							
C2	10	150		PRS150V10	BBR10-150	TC42	TD-10-150	TVA-1406	
C3	25	25		PRS25V25	BBR25-25	TC36	TD-25-25	TVA-1205	
C4	25	25		PRS25V25	BBR25-25	TC36	TD-25-25	TVA-1205	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	PENTRON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	100				BPD-0001	DD-101	LI0T1	UC-310	5GA-T1	
C6	500				BPD-0005	DD-501	BYA10T5	B-350	5GA-T5	
C7	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C8	. 05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C9	. 05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C10	. 05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C11	100				BPD-0001	DD-101	LI0T1	UC-310	5GA-T1	
C12	. 05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C13	50				BPD-00005	DD-500	LI0Q5		5GA-Q5	
C14	5000				BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C15	. 05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C16	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C17	100				BPD-0001	DD-101	BYA10T1	UC-310	5GA-T1	
C18	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C19	500				BPD-0005	DD-501	BYA10T5	B-350	5GA-T5	
C20	500				BPD-0005	DD-501	BYA10T5	B-350	5GA-T5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PENTRON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K		126-A50413-4	B-60-S	A47-500K-Z	Q13-133	U48	Volume & Switch
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US26	
R2	126Ω	2(WW)						Hum Adjust

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PENTRON PART No.	NOTES
	OHMS	WATT		
R3	270K			
R4	220K			
R5	2700Ω			
R6	220K			
R7	33K			
R8	1000Ω			
R9	180K			
R10	470K			
R11	68K			
R12	68K			
R13	3300Ω			
R14	68K			
R15	3300Ω			
R16	330K			
R17	470K			
R18	68K			
R19	3300Ω			
R20	220K			
R21	33K			
R22	470K			
R23	47K			
R24	3300Ω			
R25	100K			
R26	100K			
R27	22K			
R28	270K			
R29	10K			
R30	22K	1		
R31	750Ω	7		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		PENTRON PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Bias. Osc.	312A4					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA							
	PRI.	SEC. 1	SEC. 2	PENTRON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V@ .29A	530 VCT @. 030A	6. 3VCT @1. 8A	352-17					25R02①		

① Drill New Mounting Holes

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	PENTRON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1				60-8694	026-1B1-Q	

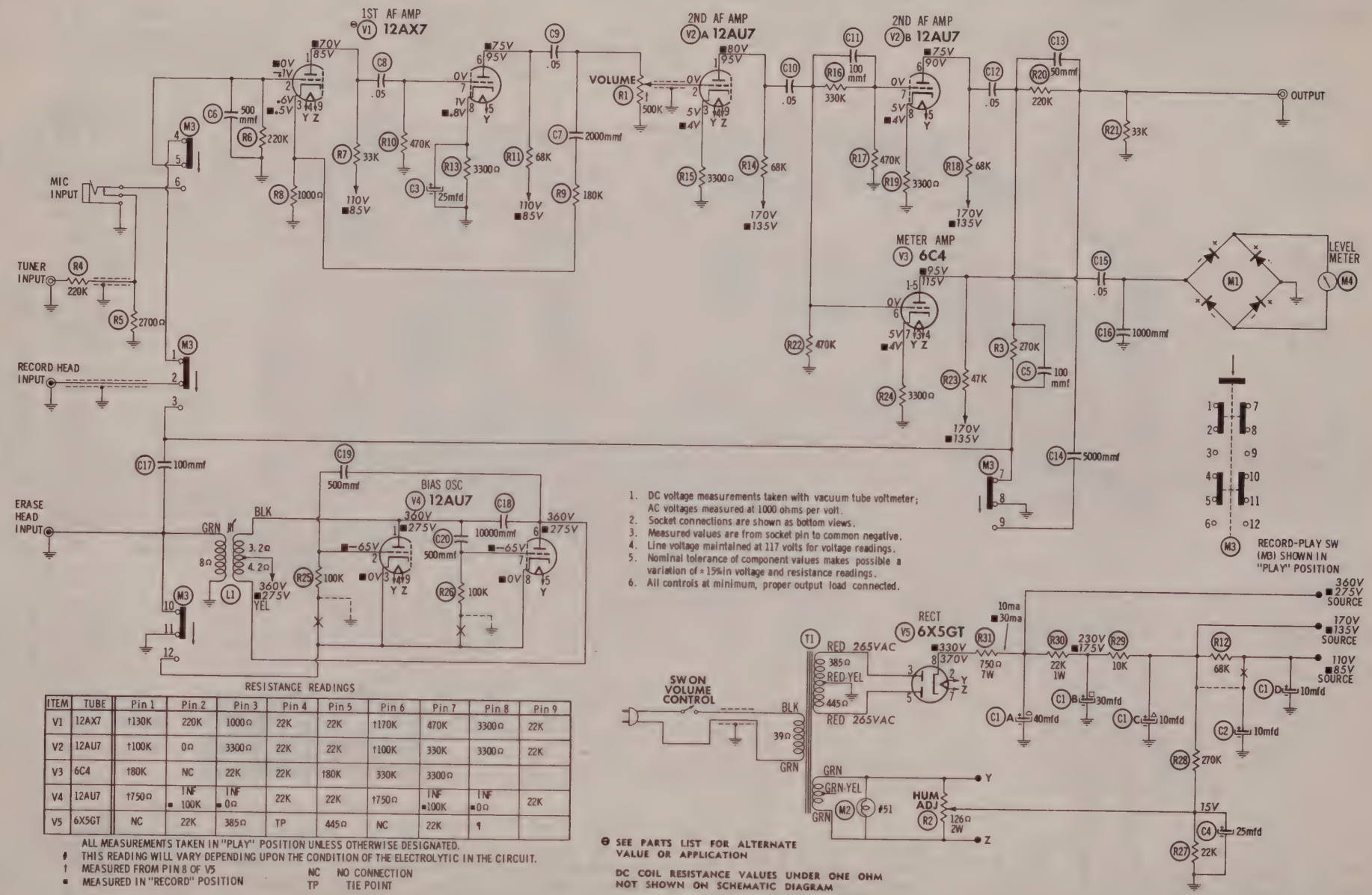
MISCELLANEOUS

ITEM No.	PART NAME	PENTRON PART No.	NOTES
M2	Lamp		#51
M3	Switch	534A14	Play-Record (4 PDT, Slide Type, Spring Return)
M4	Meter		Level

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†130K	220K	1000Ω	22K	22K	†170K	470K	3300Ω	22K
V2	12AU7	†100K	0Ω	3300Ω	22K	22K	†100K	330K	3300Ω	22K
V3	6C4	†80K	NC	22K	22K	†80K	330K	3300Ω		
V4	12AU7	†750Ω	INF ▪ 100K	INF ▪ 0Ω	22K	22K	†750Ω	INF ▪100K	INF ▪0Ω	22K
V5	6X5GT	NC	22K	385Ω	TP	445Ω	NC	22K	¶	

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V5
▪ MEASURED IN "RECORD" POSITION
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PENTRON MODEL CA-13

PHOTOFACT* Folder

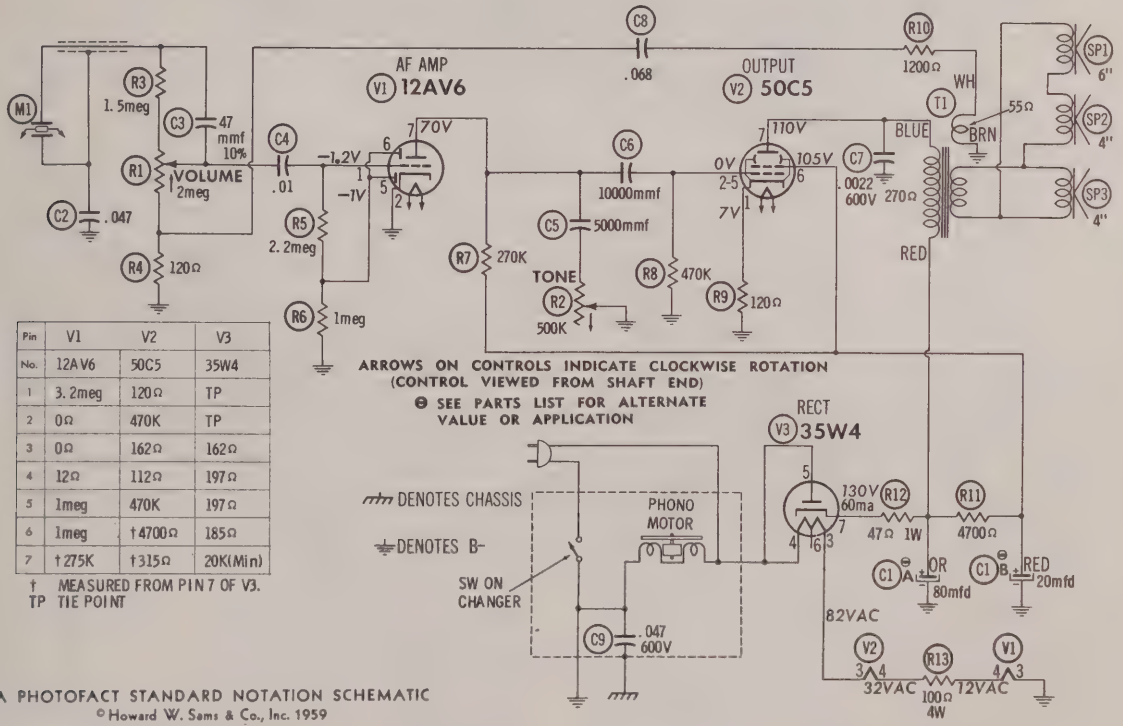
EIA MEMBER

PHILCO MODEL G-1407

PHILCO MODEL G-1407

TRADE NAME	Philco Model G-1407
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	AC Operated 3 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	105-125 Volts AC, 60 Cycles RATING 28 Watts, .29 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER M-40 - SEE SIMILAR V-M 959 - PHOTOFACT SET 396 FOLDER 13



Pin No.	V1 12AV6	V2 50C5	V3 35W4
1	3.2meg	120Ω	TP
2	0Ω	470K	TP
3	0Ω	162Ω	162Ω
4	12Ω	112Ω	197Ω
5	1meg	470K	197Ω
6	1meg	†4700Ω	185Ω
7	†275K	†315Ω	20K(Min)

† MEASURED FROM PIN 7 OF V3.
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHILCO MODEL G-1407

SET 444 FOLDER 16

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J80

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AV6	
V2	Output	50C5	

ITEM No.	USE	TYPE	NOTES
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	30-2575-42 ①	PRS150V8020	BBRT44215	TCT3107	TDLD-10	TVA-2460	
B	20	150							

① Alternate Part #30-2417-42

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	400		30-4650-45	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C3	47		10%	62-047009001	NPO-SI 47	D6-470	L10Q47	CNO-447	5TCC-Q47S 10%*	
C4	.01	400		30-4650-41	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C5	5000			30-1238-20	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C6	10000			30-1238-2	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	.0022	600		30-4650-54	P688N-0022	D6-222	CUB6D22	GEM-6222	6TM-D22	
C8	.068	400		30-4650-46	P488N-068		CUB4S68	GEM-4168	4TM-S68	
C9	.047	600		30-4650-45	P688N-047	DF-503	CUB6S47	GEM-4147	6TM-S47	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	33-5572-41	B-76	A47-2meg-Z	Q13-139	U55	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	500K	½	33-5572-44	B-60	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

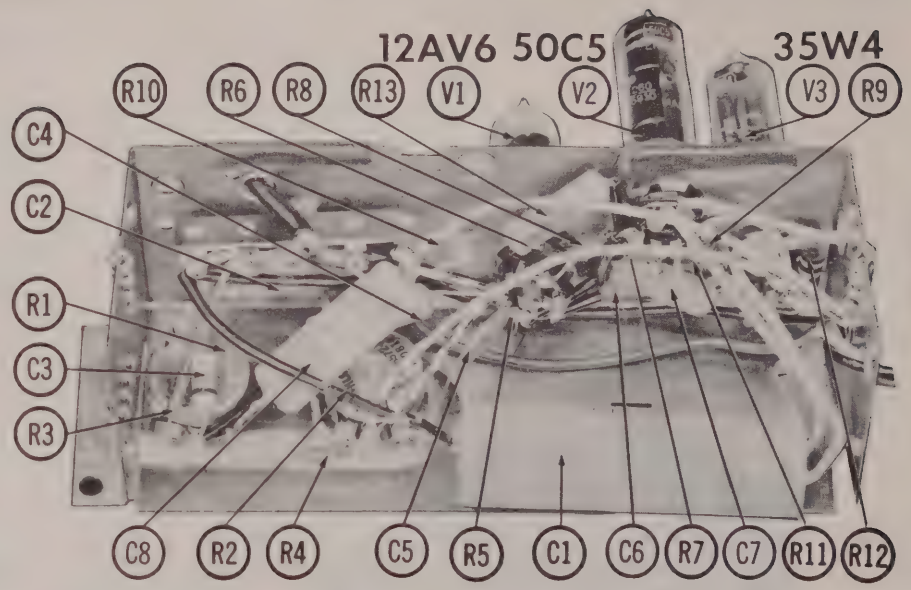
ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	NOTES
R3	1.5meg		66-5158340	
R4	120Ω		66-1128340	
R5	2.2meg		66-5228340	
R6	1meg		66-5108340	
R7	270K		66-4278340	
R8	470K		66-4478340	

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	NOTES
R9	120Ω		66-1288340	
R10	1200Ω		66-2128340	
R11	4700Ω		66-2478340	
R12	47Ω	1	66-0474340	
R13	100Ω	4	33-1360-6	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2500Ω	400Ω SEC.2 3-4Ω	32-8739-1 ①							① Part of SP1

CHASSIS-BOTTOM VIEW



SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA PHILCO PART No.	QUAM PART No.	NOTES
SP1	6"	PM	6-8Ω	36-1663-12 ①	6A3IZ6.3	① Includes T1.
SP2	4"	PM	3-4Ω	36-1675-7	4A05	
SP3	4"	PM	3-4Ω	36-1675-7	4A05	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA PHILCO PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M1	325-8037 ①	81-T ①				① Includes needles

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	54-6728-2	Control, 2 used

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

EIA

PRECISION MODELS G-30MP, PE-30MP, PE-30MP2, 30MPA

PRECISION MODELS G-30MP, PE-30MP, PE-30MP2, 30MPA

MODEL 30MPA

PRECISION MODELS G-30MP, PE-30MP, PE-30MP2, 30MPA

TRADE NAME	Precision Models G-30MP, PE-30MP, PE-30MP2, 30MPA		
MANUFACTURER	Precision Electronics, Inc. 9101 King St., Franklin Park, Illinois		
TYPE SET	AC-Battery Operated 7 Tube, 3 Channel Audio Amplifier With 4 Speed Manual Record Player		
POWER SUPPLY	6 Volt Storage Battery 12 Volt Storage Battery 110-120 Volts AC, 50-60 Cycles	RATING	8 Amp. @ 6.3 Volts DC 7 Amp. @ 12.6 Volts DC .93 Amp. @ 117 Volts AC (95 Watts Less Motor)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic Preamplifier	ECC83/12AX7	
V2	AF Amplifier	12AX7	
V3	AF Amp. - Phase Inv.	12AX7	
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	6X5GT	
V7	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PRECISION PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▬40	450		AFH3-50-05	C0372	FP396.1	TMT-37	TVL-3842	
B	■20	450							
C	▲20	450							
C2A	■10	300		AFH3-86-90	C1120	FP387.1	TMT-155	TVL-3816.4	
B	▲10	250							
C	100	15	①						
C3	20	25		PRS50V20	BBR20-25	TT25X20	ML20-25	TVA-1410	

① C2C is not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

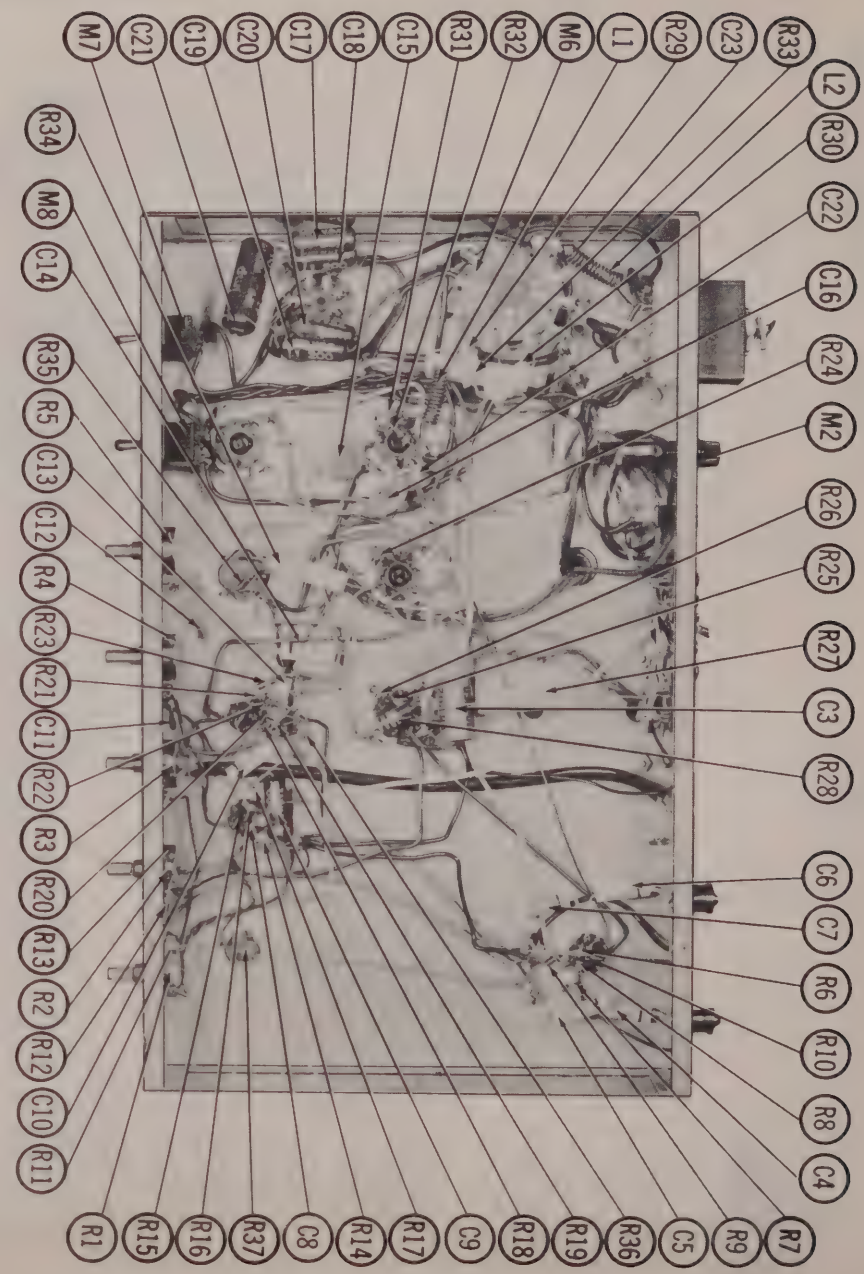
ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA PRECISION PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C5	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C8	5		10%		NPO-DI 5	D6-050	C10V5C	ZT-555	5TCCB-V5S 10%*	
C9	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C10	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	470		10%		DI-470	D6-471		JL-347	5GA-T47S 10% *	
C12	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C13	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C14	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C16	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C17	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C18	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C19	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C20	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C21	.47	200			P288N-47		CUB2P47	GEM-2047	2TM-P47	
C22	250		10%		DI-250	MD-251	L10T25		5GA-T25S 10% *	
C23	250		10%		DI-250	MD-251	L10T25		5GA-T25S 10% *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PRECISION PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	GVC-500K	B-60	A47-500K-Z	Q13-133	U48	Mic. 1
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R2A	500K	½	GVC-500K	B-60	A47-500K-Z	Q13-133	U48	Mic. 2
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R3A	500K	½	GVC-500K	B-60	A47-500K-Z	Q13-133	U48	Phono
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R4A	2meg	½	LFBC2M	B-76	A47-2meg-Z	Q13-139	U55	Bass
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
R5A	500K	½	GVC-500K	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	

CHASSIS-BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PRECISION PART No.	NOTES
R6	3.3meg			
R7	100K			
R8	3.3meg			
R9	100K			
R10	220K			
R11	470K			
R12	470K			
R13	470K			
R14	1000Ω			
R15	470K			
R16	1meg			
R17	100K			
R18	220K			
R19	100K			
R20	3900Ω			
R21	100K			
R22	1000Ω			
R23	120K			
R24	1000Ω 5%			
R25	120K			
R26	1000Ω 5%			
R27	250Ω	10		
R28	68K	2		
R29	20Ω	5		
R30	20Ω	5		
R31	47Ω			
R32	47Ω			
R33	10Ω	10		
R34	5600Ω	7		
R35	1000Ω			
R36	22K			
R37	22K			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA PRECISION PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	"A" Lead Choke						
L2	"A" Lead Choke						

TRANSFORMER (POWER)

ITEM No.	RATING	REPLACEMENT DATA PRECISION PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6VDC OPERATION PRI. 1: 6V @ 8A PRI. 2: 6V @ 8A SEC. 1: 750VCT @ .130A 12VDC OPERATION PRI. 1: 12V @ 7A PRI. 2: 12V @ 7A SEC. 1: 750VCT @ .130A AC OPERATION PRI.: 117V @ .93A SEC. 1: 760VCT @ .130A SEC. 2: 8VCT Not used SEC. 3: 8VCT Not used Tap @ 6.3V @ 4A SEC. 4: SEC. 5:	TPM-2						

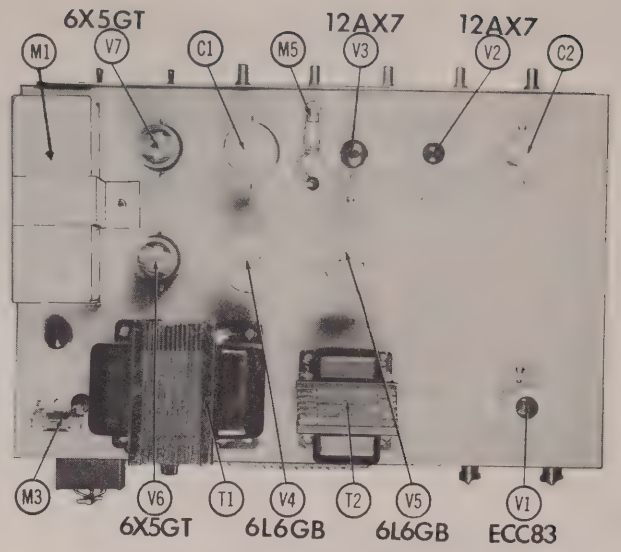
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PRECISION PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5800Ω CT	500Ω Tap @ 200Ω (20V) 16Ω, 8Ω, 4Ω	TO-30		A-3131 ①		A-3800 ①	22S97 ①	S-60A ①	① Drill new mounting hole

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA PRECISION PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M1		6V	60~	4G1	6VB6M		6VB6M	

CHASSIS—TOP VIEW



FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA PRECISION PART No. FUSE	PRECISION PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	3A 250V			312003. (3AG 3A 250V)	342001	AGC3	HKP
M3	3AG	25A 32V			311025. (3AG 25A 32V)	357001	SFE20	4406

PHONO CARTRIDGE

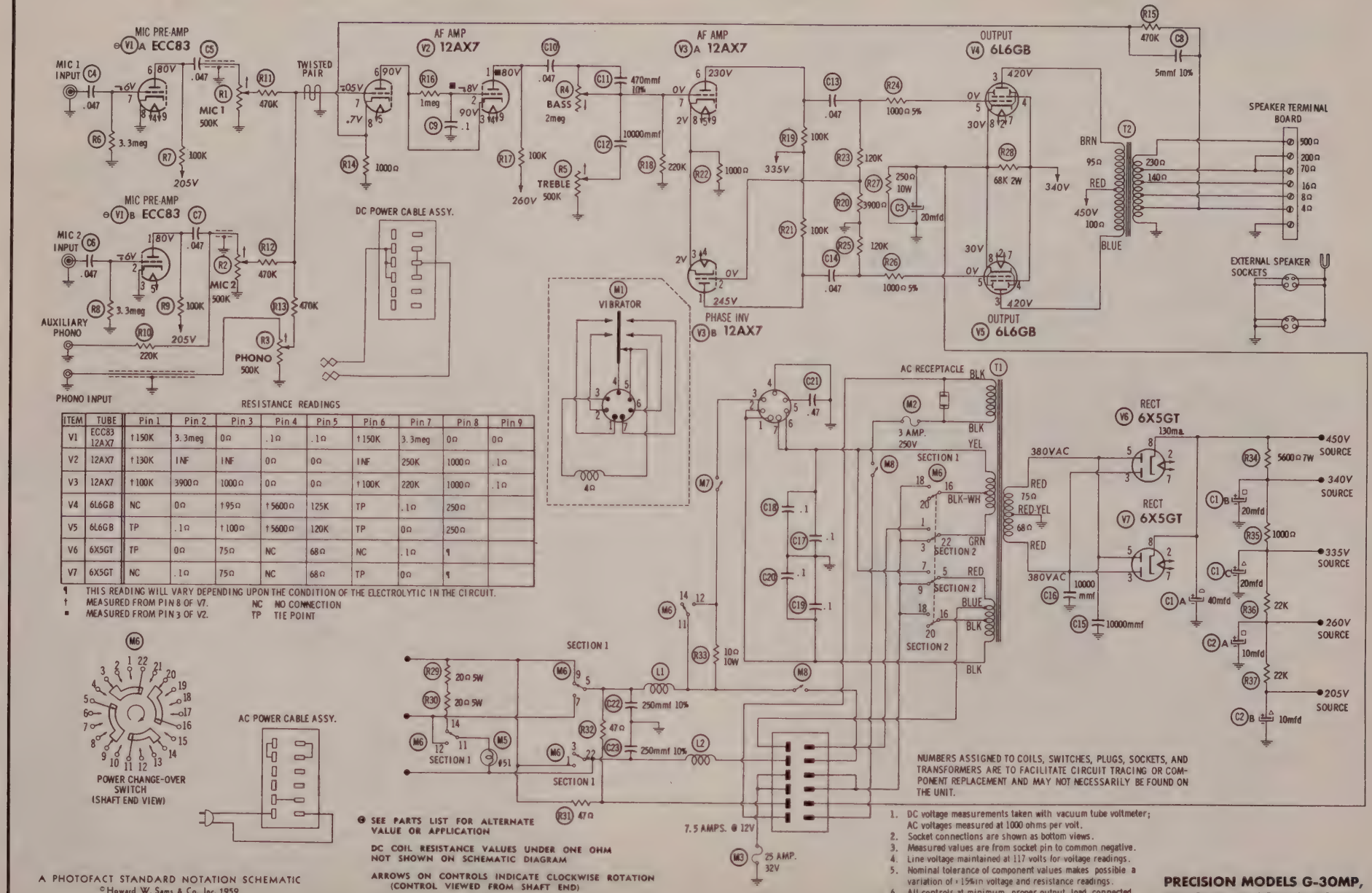
ITEM No.	REPLACEMENT DATA PRECISION PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M4		† 81-T * P-81-T				† Includes needles * Tone Arm Complete with Cartridge

MISCELLANEOUS

ITEM No.	PART NAME	PRECISION PART No.	NOTES
M5	Lamp		#51
M6	Switch		Power Changeover (2 Position, Rotary Wafer Type)
M7	Switch		Filaments On-Off (SPST, Toggle Type)
M8	Switch		AC Off, Vibrator On-Vibrator Off, AC On (DPDT, Toggle Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†150K	3.3meg	0Ω	.1Ω	.1Ω	†150K	3.3meg	0Ω	0Ω
V2	12AX7	†130K	INF	INF	0Ω	0Ω	INF	250K	1000Ω	.1Ω
V3	12AX7	†100K	3900Ω	1000Ω	0Ω	0Ω	†100K	220K	1000Ω	.1Ω
V4	6L6GB	NC	0Ω	†95Ω	†5600Ω	125K	TP	.1Ω	250Ω	
V5	6L6GB	TP	.1Ω	†100Ω	†5600Ω	120K	TP	0Ω	250Ω	
V6	6X5GT	TP	0Ω	75Ω	NC	68Ω	NC	.1Ω	¶	
V7	6X5GT	NC	.1Ω	75Ω	NC	68Ω	TP	0Ω	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V7. NC NO CONNECTION
▪ MEASURED FROM PIN 3 OF V2. TP TIE POINT

G SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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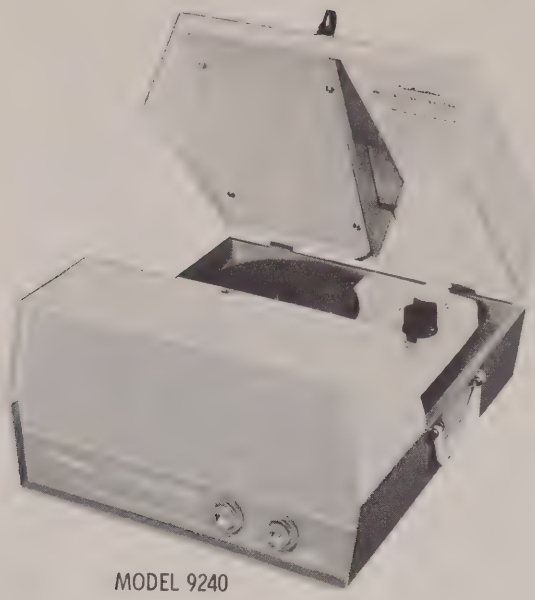
PRECISION MODELS G-30MP, PE-30MP, PE-30MP2, 30MPA

PHOTOFACT* Folder

SILVERTONE MODELS 9240, 9252, 9253 (Ch. 528.59240, 250)

SILVERTONE MODELS 9240,
9252, 9253 (Ch. 528.59240, 250)

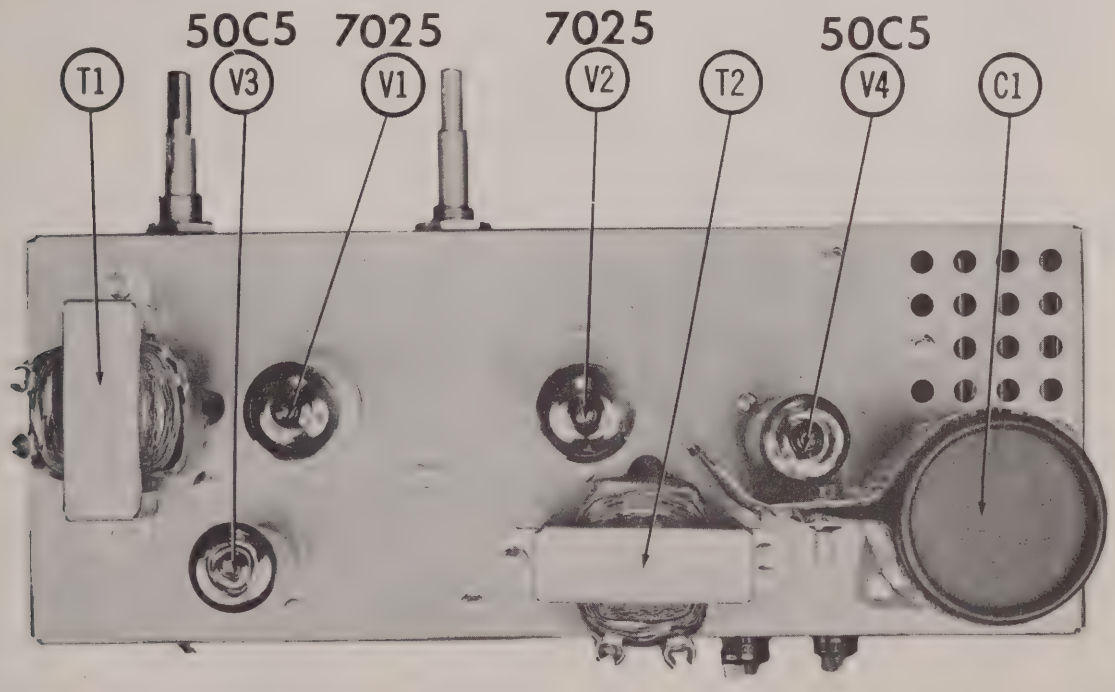


MODEL 9240

TRADE NAME	Silvertone Models 9240, 9252, 9253 (Ch. 528.59240, 528.59250)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With Record Player
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 33 Watts, .37 Amp. @117 Volts AC

RECORD CHANGER 528.57160 OR 528.57170 IS AN AUTOMATIC 45 RPM AND MANUAL 16-33-78 RPM UNIT USED IN MODEL 9240
RECORD CHANGER 528.56520 OR 528.56530 IS A 4 SPEED AUTOMATIC UNIT USED IN MODELS 9252 AND 9253

SILVERTONE MODELS 9240,
9252, 9253 (Ch. 528.59240, 250)



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 444 FOLDER 18

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Left Channel AF Amp. - Right Channel AF Amp.	7025	
V2	Left Channel AF Amp. - Right Channel AF Amp.	7025	
V3	Left Channel Output	50C5	
V4	Right Channel Output	50C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Silvertone PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲150	150	18-40-3	AFH4-01-40	D0014			TVLS-3449.1*	
B	▲50	150							
C	■50	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	400		16-47348	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C3	1000		10%	15-10211	DI-1000			JL-210	5GA-D1S 10%*	
C4	47		10%	15-47016		D6-470	C10Q47U	CNO-447	5GA-Q47S 10%*	
C5A	5000			20-128-0	BPD-2X0047	DD2-502	BYC6DD5	B-250	5HK-2D47	
B	5000							B-250		
C6	20000			15-20316	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C7	100		N750 10%	15-10111	N750-DI 100	DTN-100	CTA6T1U	CN7-310	5TCU-T1S 10%*	
C8	20000			15-20316	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C9	750		10%	15-75111	DI-750			JL-375	5GA-T75S 10%*	
C10	20000			15-20316	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C11	20000			15-20316	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C12	6000			15-60216	BPD-006	DD-602	BYA10D6	B-260	5HK-D6	
C13	47		10%	15-47016		D6-470	C10Q47U	CNO-447	5GA-Q47S 10%*	
C14	20000			15-20313	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C15	100		N750 10%	15-10111	N750-DI 100	DTN-100	CTA6T1U	CN7-310	5TCU-T1S 10%*	
C16	20000			15-20313	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C17	750		10%	15-75111	DI-750			JL-375	5GA-T75S 10%*	
C18	20000			15-20313	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C19	20000			15-20313	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C20	6000			15-60216	BPD-006	DD-602	BYA10D6	B-260	5HK-D6	
C21	.047	400		16-47348	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C22	20000			20-124-0	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Silvertone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	1/2	24-332-0					Volume, Left Channel. Tap
B	2meg	1/2						Volume, Right Channel. Tap
R2A	500K	1/2	24-183-0	AB-60	AD47-500K-Z	Q13-133		Tone, Left Channel Note 1
B	500K	1/2		SR-60	Not Req.	M13-133		Tone, Right Channel Note 1
C	Shaft	1/2		AK-8	RS-3/16	NQ		

Note 1. Chassis 528.59250 uses two of these controls same part No. in a Treble, Bass application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Silvertone PART No.	NOTES
R3	1meg		60-10501	
R4	470K		60-47401	
R5	100K		60-10401	
R6	1meg		60-10501	
R7	270K		60-27401	
R8	4700Ω		60-47201	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	Silvertone PART No.	NOTES
R9	1meg		60-10501	
R10	560K		60-56401	
R11	2200Ω		60-22201	
R12	270K		60-27401	
R13	2700Ω		60-27201	
R14	470K		60-47401	
R15	1000Ω		60-10201	
R16	150Ω		60-15101	
R17	100K		60-10401	
R18	1meg		60-10501	
R19	270K		60-27401	
R20	4700Ω		60-47201	
R21	1meg		60-10501	
R22	560K		60-56401	
R23	2200Ω		60-22201	
R24	270K		60-27401	
R25	2700Ω		60-27201	
R26	470K		60-47401	
R27	1000Ω		60-10201	
R28	150Ω		60-15101	
R29	22K		60-22301	
R30	2700Ω	1	60-27211	
R31	27Ω	2	61-6-1	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Silvertone PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω	6-8Ω	80-78-1	Z1001	A-2902①	AU-604①	A-3849①	22S86		① Drill new mounting hole
T2	2700Ω	6-8Ω	80-78-1	Z1001	A-2902①	AU-604①	A-3849①	22S86		

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Silvertone PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	6-8Ω	33-384-4①	52A21Z7.6	① Used in Model 9240
SP2	5 1/4"	PM	6-8Ω	33-384-4①	52A21Z7.6	
	6" x 9"	PM		33-317-4②		② Used in Models 9252, 9253
	6" x 9"	PM		33-317-4②		

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Silvertone PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.090A	83-1193①	1235AH① HA154②	T150 ① SD-94 ②	150① K200②	① Selenium Type ② Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA Silvertone PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M2	33-304-0	*13 TB				Model 9240
	33-311-0	*13-TB				Models 9252, 9253
						* Includes mounting mechanism and needles.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA Silvertone PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M3			201DS ♦†	Model 9240
	83-1250 (78) 83-1251 (LP)		* W-101STS †† * W-101STD †♦ * W-102 †	Models 9252, 9253 * Includes Cartridge. Requires mounting mechanism.

† Jewel ♦ Diamond

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M4	Switch	69-251-0	Power On-Off, SPST, Model 9240
M5	Motor	59-67	Complete, Record Changer Chassis 528.57160
	Motor	59-66	Complete, Record Changer Chassis 528.57170
	Motor	59-72	Complete, Record Changer Chassis 528.56520
	Motor	59-89	Complete, Record Changer Chassis 528.56530
	Switch	69-282-0	Monaural-Stereo, SPST (Slide Type) Record Changer Chassis 528.56520, 530
	Switch	69-279-0	Reject, SPST (Push Button Type) Models 9252, 9253
	Switch	84-6552	Power On-Off, SPST, Includes Spring, Models 9252, 9253
	Magnet Coil	27-71-2	Reject, Record Changer Chassis 528.56520, 530

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-1143-0	Volume, Right Model 9240
Knob	52-1104-0	Volume, Right Models 9252, 9253
Knob	52-1109-0	Volume, Left Model 9240
Knob	52-1150-0	Volume, Left Model 9252, 9253

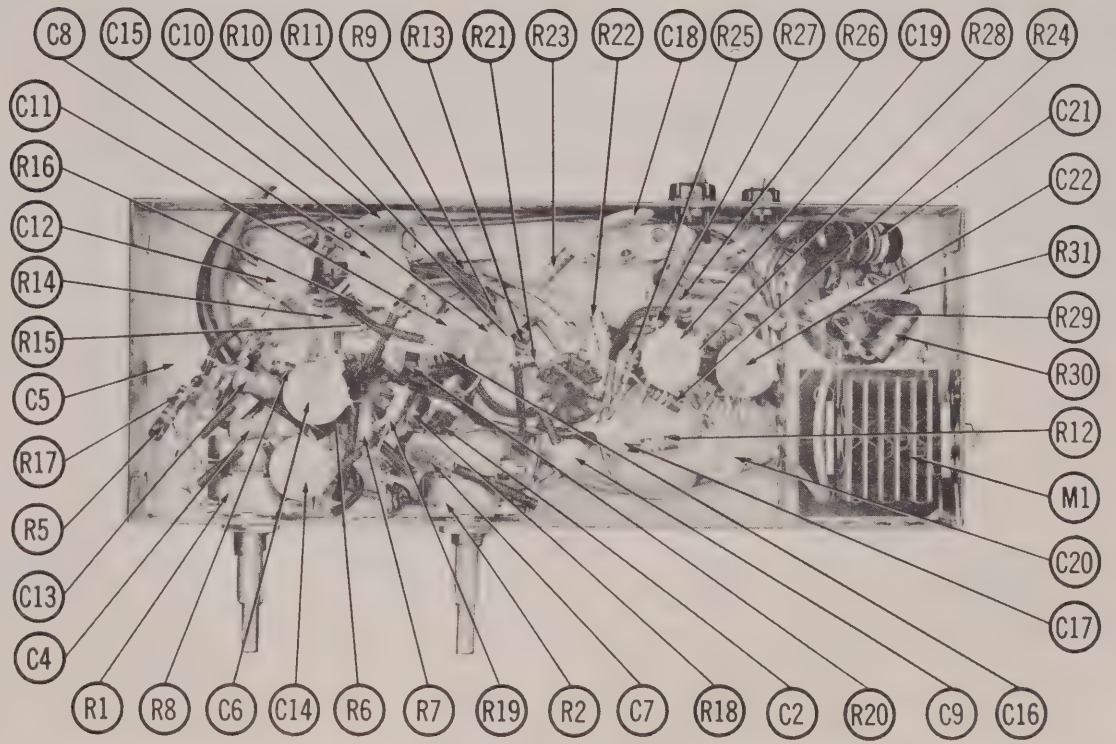
CABINETS & CABINET PARTS

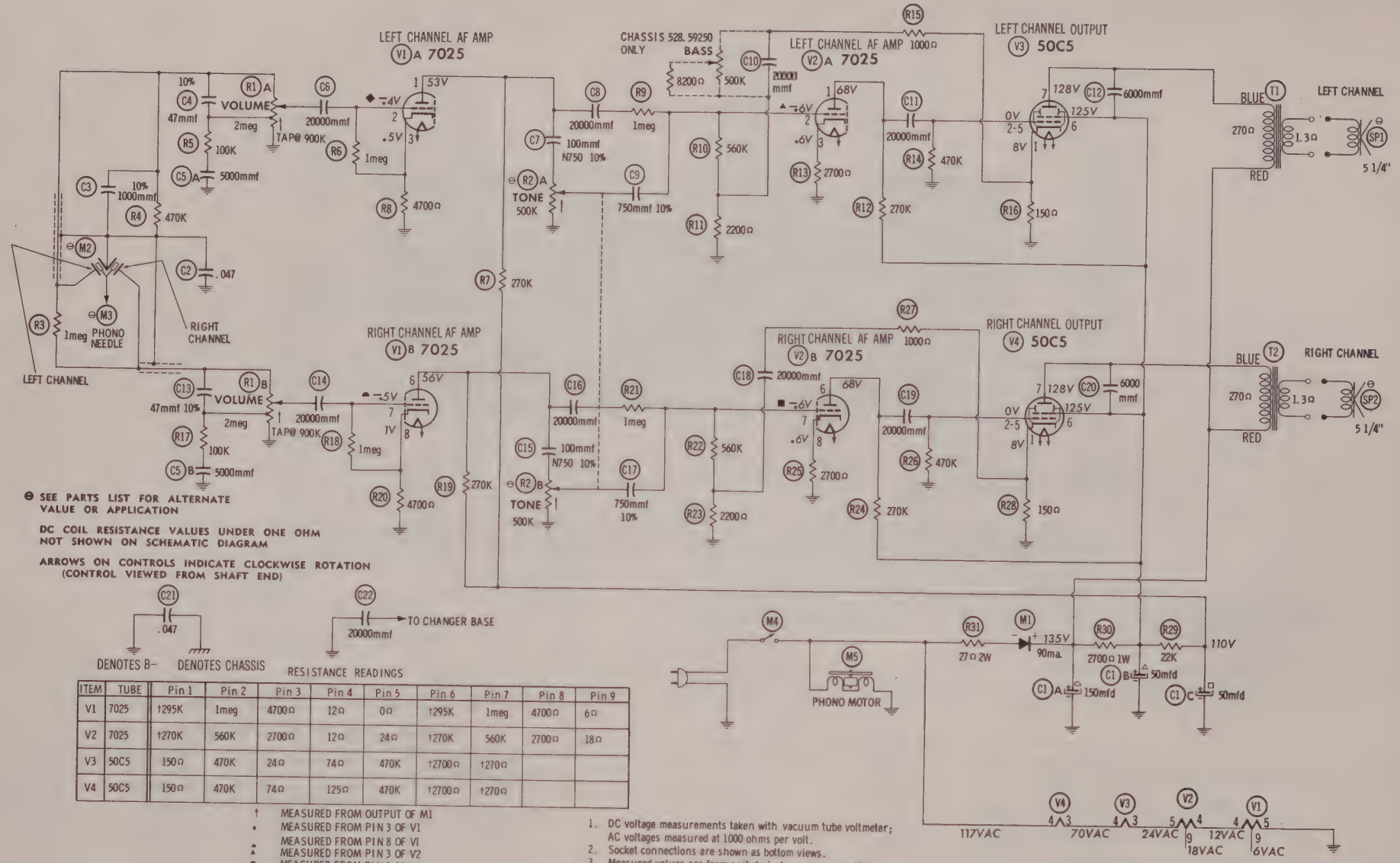
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-1144-0	Tone, 2 Used In Models 9252, 9253
Knob	52-764-0	Power On-Off
Knob	52-771-0	Speed Selector, Reject
Knob	52-1122-0	On-Off-Reject, Record Changer Chassis 528.56520, 530
Knob	52-917-0	Speed Control, Record Changer Chassis 528.56520, 530
Button	52-1123-0	Reject, Record Changer Chassis 528.56520, 530
Cabinet	42-76-2	Includes Lid, Model 9240
Cabinet	42-77-2	Record Changer, Includes Mounting Board, Models 9252, 9253
Cabinet	42-14-4	External Speaker
Handle	49-271	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†295K	1meg	4700Ω	12Ω	0Ω	†295K	1meg	4700Ω	6Ω
V2	7025	†270K	560K	2700Ω	12Ω	24Ω	†270K	560K	2700Ω	18Ω
V3	50C5	150Ω	470K	24Ω	74Ω	470K	†2700Ω	†270Ω		
V4	50C5	150Ω	470K	74Ω	125Ω	470K	†2700Ω	†270Ω		

† MEASURED FROM OUTPUT OF M1
◆ MEASURED FROM PIN 3 OF V1
▲ MEASURED FROM PIN 8 OF V1
▲ MEASURED FROM PIN 3 OF V2
■ MEASURED FROM PIN 8 OF V2

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SILVERTONE MODELS 9240, 9252, 9253 (Ch. 528.59240, 250)

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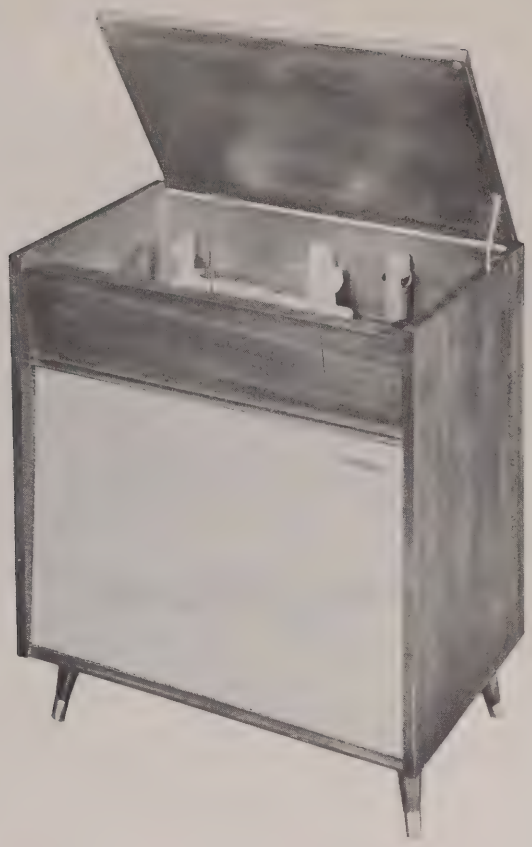
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TRAV-LER MODEL 6528

TRAV-LER
MODEL 6528



TRAV-LER
MODEL 6528

TRADE NAME	Trav-Ler Model 6528
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES (Six)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 12AX7 AF Amp.-Phase Inverter, (2) 35C5 Output
POWER SUPPLY	110-125 Volts AC-60 Cycles RATING .31 Amp. @ 117 Volts AC (28 Watts) Less Motor
TUNING RANGE—BROADCAST	535 - 1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR MONARCH UA8-PHOTOFACT SET 381 FOLDER 11

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to antenna stator lug of tuning gang. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat steps 2 and 3.
4.		Loop	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H735

SET 444 FOLDER 19

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	AF Amp.-Phase Inv.	12AX7	
V5	Output	35C5	
V6	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	EC-73	PRS150V4040	BBRT0185	TCT3115	TDLT-5	FMT-1540	R2714 *
B	40	150		40					
C	40	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	TRAV-LER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	220				MD-221	L10T22		5TCC-T22	10%
C3	68			1469-000068	DD-680	22R5Q68		MS-468	10% ①
C4	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C5	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C6	330				MD-331	L10T33			10%
C7	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C8	1000								10%
C9	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C10	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C11	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C12	270			SI 270	D6-271	LT6T27	UC-5327	5GA-T27	
C13	680				MD-681				10%
C14	680				MD-681				10% ②
C15	2000								10%
C16	2000								10%
C17	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C18	1000								10%
C19	.22	200		P288N-22		CUB2P22	GEM-2022	2TM-P22	
C20	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C21	1000								10% ②
C22	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C23	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C24	2.0	50							③
C25	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C26	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

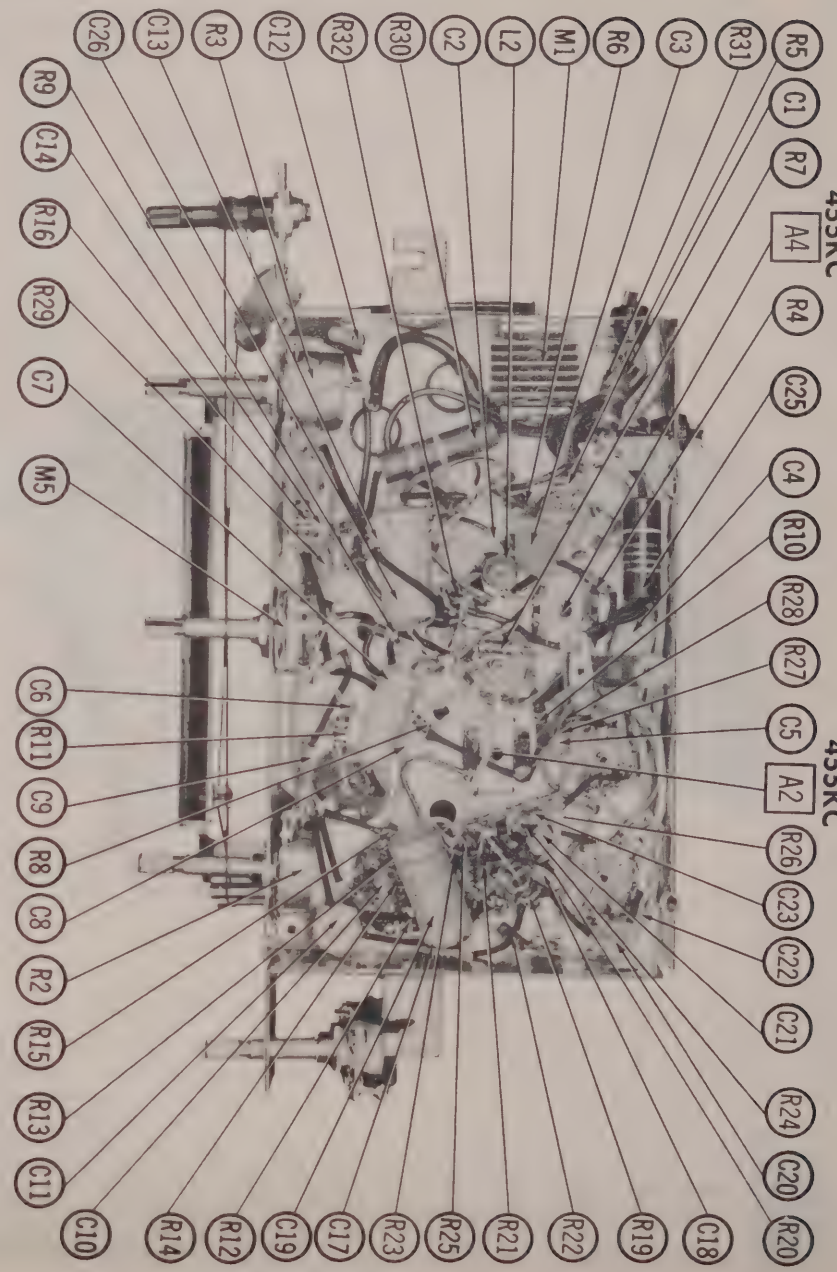
① Some versions may use 47mmf in this application.
② Not used in some versions.
③ Some versions may use .05mfd in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3meg	½	VC-136					Loudness, Taps ② 1meg & 2meg
B	Shaft							
R2A	5meg	½	VC-134	B-87	A47-5meg-S	Q11-141	U67	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	250K	½	VC-135	BT-65	A47F1-250K	Q13-130X		Treble, Tap ② 150K
B	Shaft			Not Req.	KSS-3	Not Req.		
C	Switch			KB-1 or KR-1*	SWE-12	76-1		Power On-Off

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

CHASSIS-BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING Ω OHMS	RATING Ω WATT	TRAV-LER PART No.	NOTES
R4	1meg			
R5	22K			
R6	47Ω			
R7	120Ω			
R8	680K			
R9	150K			
R10	3.3meg			
R11	470K			
R12	470K			
R13	330K			
R14	2200Ω			
R15	110K 5%			Note 1
R16	470K			Note 2
R17	110K 5%			Note 1
R18	110K 5%			Note 1

ITEM No.	RATING OHMS	RATING WATT	TRAV-LER PART No.	NOTES
R19	470K			
R20	220K			
R21	2200Ω			
R22	1meg			
R23	56K			
R24	220K			
R25	10K			
R26	470K			
R27	220Ω	1		
R28	470K			
R29	2200Ω	1		Note 3
R30	270Ω	2		
R31	22Ω	2		
R32	220K			

Note 1. Some versions may use 100K in this application.
Note 2. Some versions may use 33K in this application.
Note 3. Some versions may use 18K in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA TRAV-LER PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	LL-51					
L2	Osc. Coil	LO-21	14-1060	BC-387	71-OSC.		
L3	Input IF	LI-19	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	LI-19	16-6758	BC-353	12-C2	RF-2	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	4000Ω CT	8Ω Tap ② 1.7Ω, .8Ω	AT-30	Z1002	A-2901	AU-600	A-3823	24S61	S-53X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA TRAV-LER PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	SPK-27 ①	6A1	① Parallel and phase.
SP2	6"	PM	3-4Ω	SPK-27 ①	6A1	
SP3	3½"	PM	4-6Ω	SPK-28	3A15TZ4.7	

SELENIUM RECTIFIER

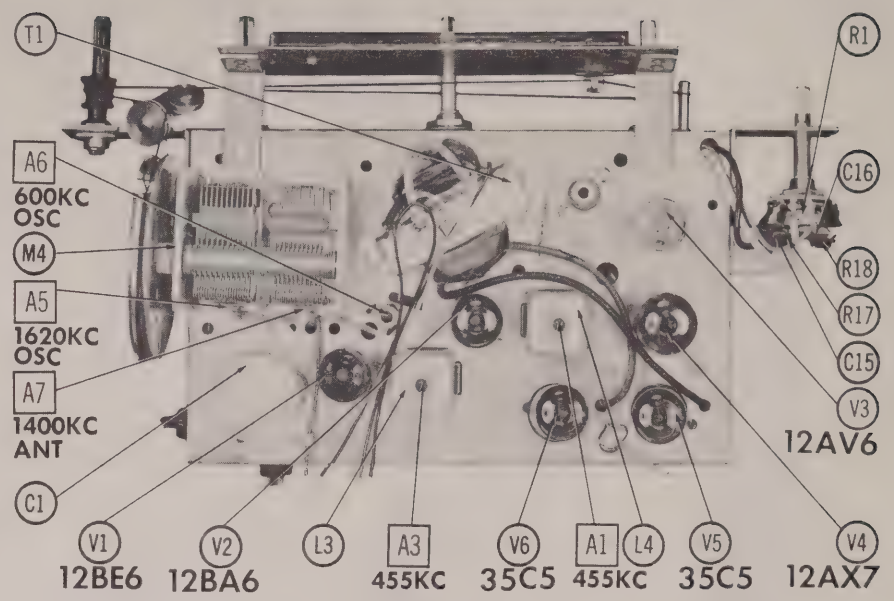
ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA TRAV-LER PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.064A	SR-4	1235AH	T100 SD-92 ①	100A K200 ①	① Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA TRAV-LER PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M2		55-T or 81-TB	GD-J			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—TOP VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

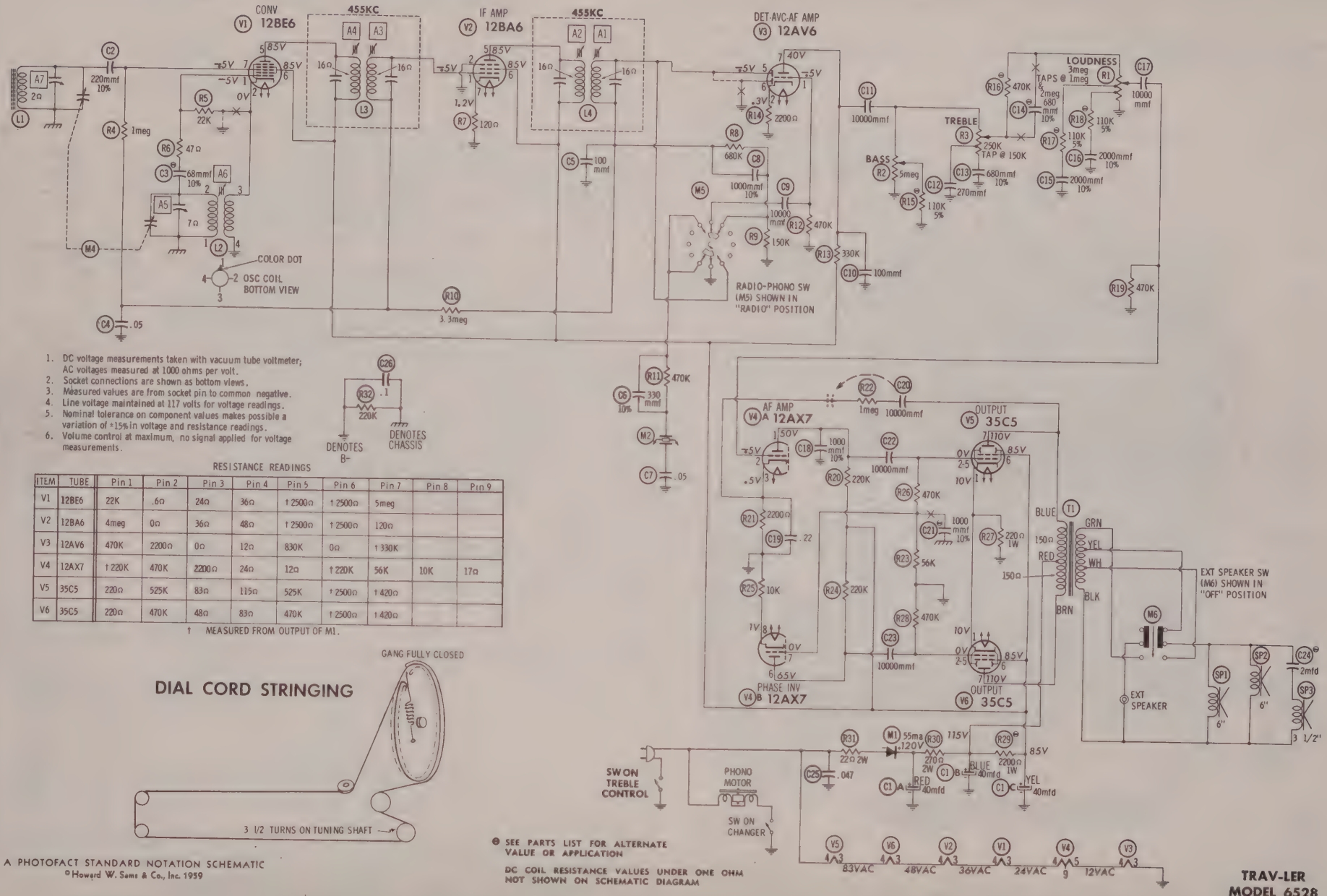
ITEM No.	REPLACEMENT DATA TRAV-LER PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M3		† S-66 or †♦ S-66SD or ♦ S-66D	† W-75TPS or †♦ W-75DS or ♦ W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M4	Tuning Cap.	GC-24	2 Gang (Ant. 18-384mmf, Osc. 18-166mmf)
M5	Switch	SW-1	Phono-Radio, Rotary, Wafer Type
M6	Switch	SW-27	External Speaker, DPDT, Slide Type

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BE6	22K	.6Ω	24Ω	36Ω	†2500Ω	†2500Ω	5meg		
V2	12BA6	4meg	0Ω	36Ω	48Ω	†2500Ω	†2500Ω	120Ω		
V3	12AV6	470K	2200Ω	0Ω	12Ω	830K	0Ω	†330K		
V4	12AX7	†220K	470K	2200Ω	24Ω	12Ω	†220K	56K	10K	17Ω
V5	35C5	220Ω	525K	83Ω	115Ω	525K	†2500Ω	†420Ω		
V6	35C5	220Ω	470K	48Ω	83Ω	470K	†2500Ω	†420Ω		

† MEASURED FROM OUTPUT OF M1.

DIAL CORD STRINGING

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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TRAV-LER MODEL 6528

PHOTOFACT* Folder

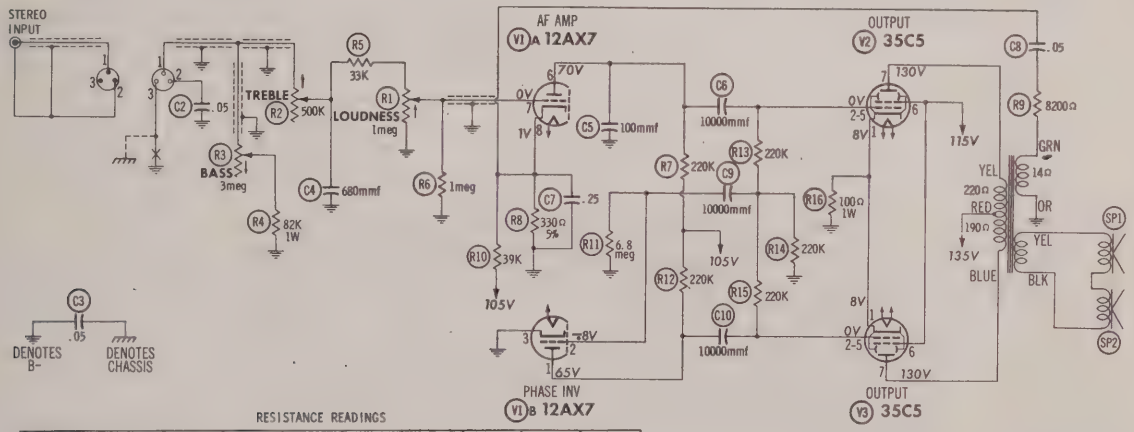
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE
MODELS H-47SE1, H-47SE2

WESTINGHOUSE
MODELS H-47SE1, H-47SE2

MODEL H-47SE1

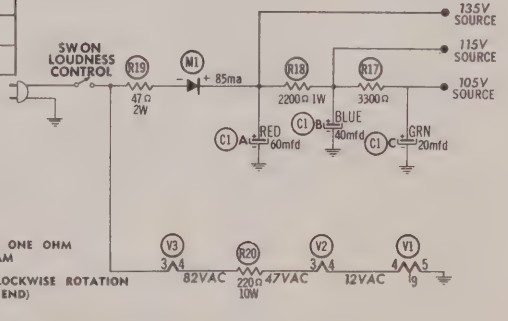
TRADE NAME	Westinghouse Models H-47SE1, H-47SE2
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N. J.
TYPE SET	AC Operated 3 Tube Audio Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 34 Watts, .30 Amp. @ 117 Volts AC



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†225K	6.8meg	0Ω	12Ω	0Ω	†225K	0Ω	330Ω	6Ω
V2	35C5	100Ω	440K	47Ω	12Ω	440K	†2200Ω	†220Ω		
V3	35C5	100Ω	440K	292Ω	167Ω	440K	†2200Ω	†190Ω		

† MEASURED FROM OUTPUT OF M1.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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J69

SET 444 FOLDER 20

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier-Phase Inverter	12AX7	

ITEM No.	USE	TYPE	NOTES
V2	Output	35C5	
V3	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	CE101	PRS150V8040	BBRT84215	WT407		TVLS-3442.9*	
B	40	150		20					
C	20	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C3	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C4	680				BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C5	100				BPD-0001	DD-101	L10T1	UC-310	5GA-T1	
C6	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	.25	200			P288N-25		CUB2P25	GEM-2025	2TM-P25	
C8	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C9	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C10	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	VC-166	B-70	A47-1meg-Z	Q13-137	U53	Loudness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	
R2A	500K	½	VC-141	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	3meg	½	VC-198	B-85	A47-3meg-Z	Q13-140	U57	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

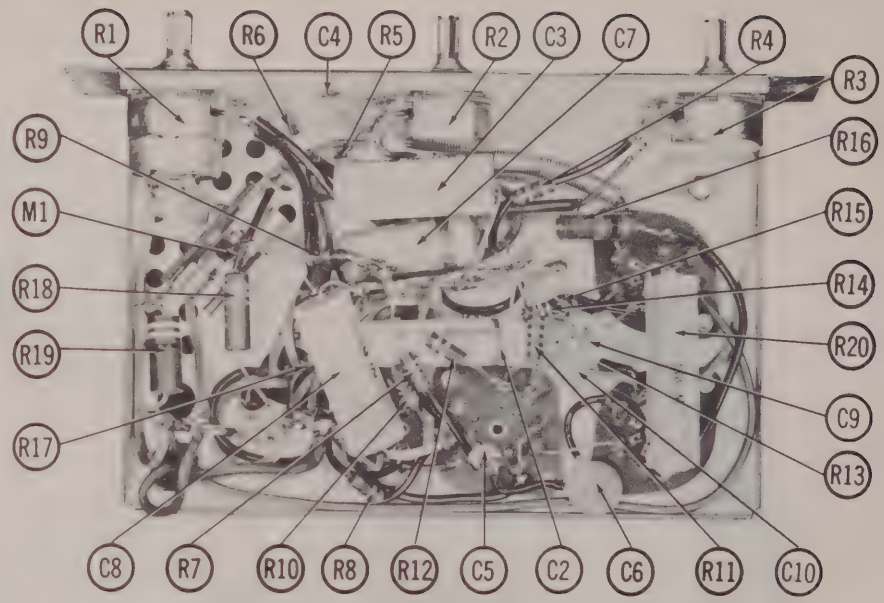
ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R4	82K	1		
R5	33K			
R6	1meg			
R7	220K			
R8	330Ω 5%			
R9	8200Ω			
R10	39K			
R11	6.8meg			
R12	220K			

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R13	220K			
R14	220K			
R15	220K			
R16	100Ω	1		
R17	3300Ω			
R18	2200Ω	1		
R19	47Ω	2		
R20	220Ω	10		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC. 1	REPLACEMENT DATA Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3000Ω CT	6-8Ω SEC. 2 30Ω	TR-119							

CHASSIS—BOTTOM VIEW



SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	SP-609 ①	6A21	① Series and Phase
SP2	6"	PM	3-4Ω	SP-609 ①	6A21	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.084A	SR-105 ①	HF154 ①	SD-94 ①	M150 ①	① Silicon Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN-274	Volume-On-Off, Bass, Treble
Cabinet	CB-471	Brown and White
Cabinet	CB-472	Charcoal and White

WIRING DATA

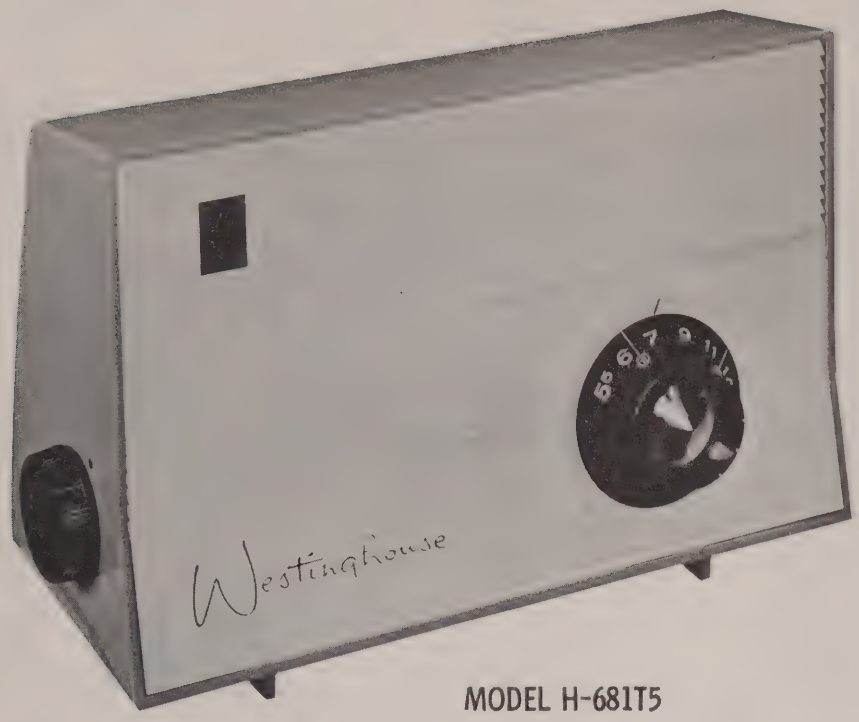
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

WESTINGHOUSE MODELS H-681T5, H-682T5, H-683T5 (Ch. V-2395-1)

WESTINGHOUSE MODELS H-681T5, H-682T5, H-683T5 (Ch. V-2395-1)



MODEL H-681T5

WESTINGHOUSE MODELS H-681T5, H-682T5, H-683T5 (Ch. V-2395-1)

TRADE NAME	Westinghouse Models H-681T5, H-682T5, H-683T5 (Ch. V-2395-1)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N. J.
TYPE SET	AC-DC Operated 5 Tube AM Receiver
POWER SUPPLY	105-120 Volts AC-DC
RATING	28 Watts, .29 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 - 1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4..... GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200mmf	High side to antenna stator lug of tuning gang. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.		Loop	1625KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	1400KC	"	A6	"

DISASSEMBLY

1. Disengage volume control knob from shaft. Knob is captive and remains with cabinet.
2. Remove two screws from cabinet back.
3. Loosen Screw on cabinet bottom. Push forward on screw to disengage AC interlock. Remove screw.
4. Separate front of cabinet from back. (Printed board mounts to front.)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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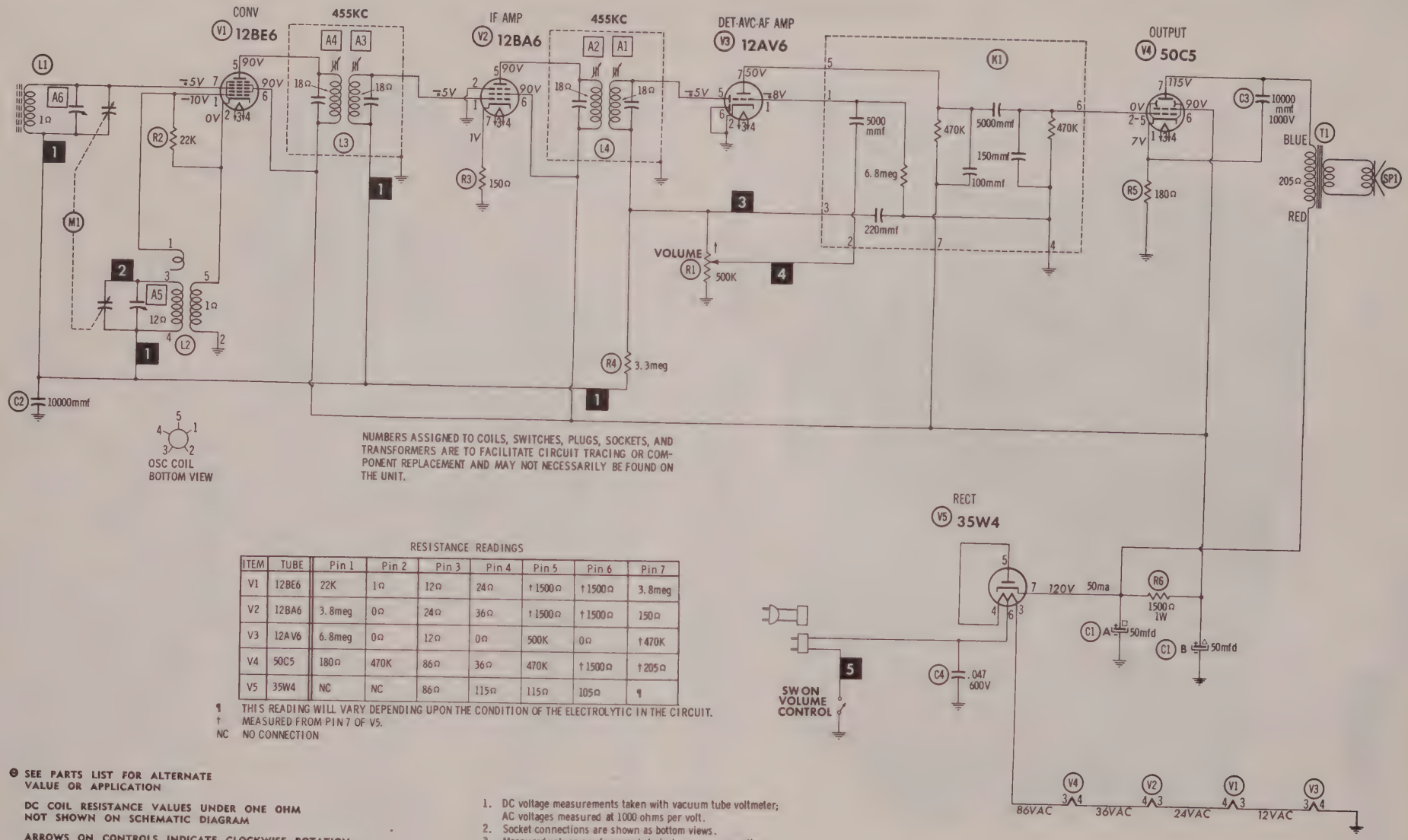

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	12Ω	24Ω	†1500Ω	†1500Ω	3.8meg
V2	12BA6	3.8meg	0Ω	24Ω	36Ω	†1500Ω	†1500Ω	150Ω
V3	12AV6	6.8meg	0Ω	12Ω	0Ω	500K	0Ω	†470K
V4	50C5	180Ω	470K	86Ω	36Ω	470K	†1500Ω	†205Ω
V5	35W4	NC	NC	86Ω	115Ω	115Ω	105Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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WESTINGHOUSE MODELS H-681T5, H-682T5, H-683T5 (Ch. V-2395-1)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. - AVC - AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■50	150	218V025H07	PRS150V5050	BBRD5515	WD215	TDLD-9	PCLS-2435.1*	
B	▲50	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	10000			215V111A03	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C3	10000	1000		215V300H03	DAC-27	DD-103	BYA10S1	B-110	5HK-S1	
C4	.047	600		210V115H05	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	500K	½	270V044H03					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R2	22K		250V222A23	
R3	150Ω		250V221A51	
R4	3.3meg		250V223A35	

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R5	180Ω		250V221A81	
R6	1500Ω	1	250V321A52	

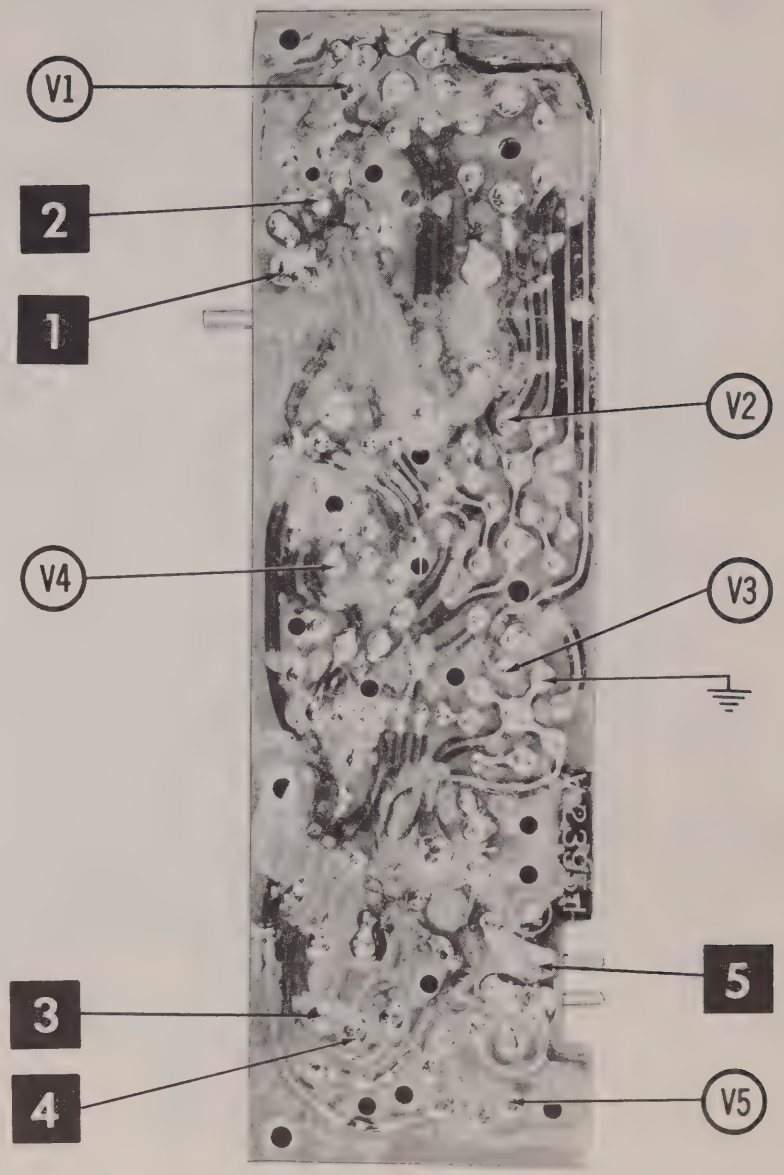
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
K1	Audio Coupling Net	100mmf, 150mmf, 220mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	219V001M01	Sprague DT-5

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Westinghouse PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	310V044H01					
L2	Osc. Coil	230V040H04					
L3	Input IF	235V023H11	16-6780	BC-356	13-PC1	RF-4	
L4	Output IF	235V023H11	16-6780	BC-357	13-PC2	RF-4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2700Ω	3-4Ω	Part of SP1	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	570V055H01①	4A1R	① Includes T1.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M1	Tuning Cap.	330V014H03	2 Gang

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

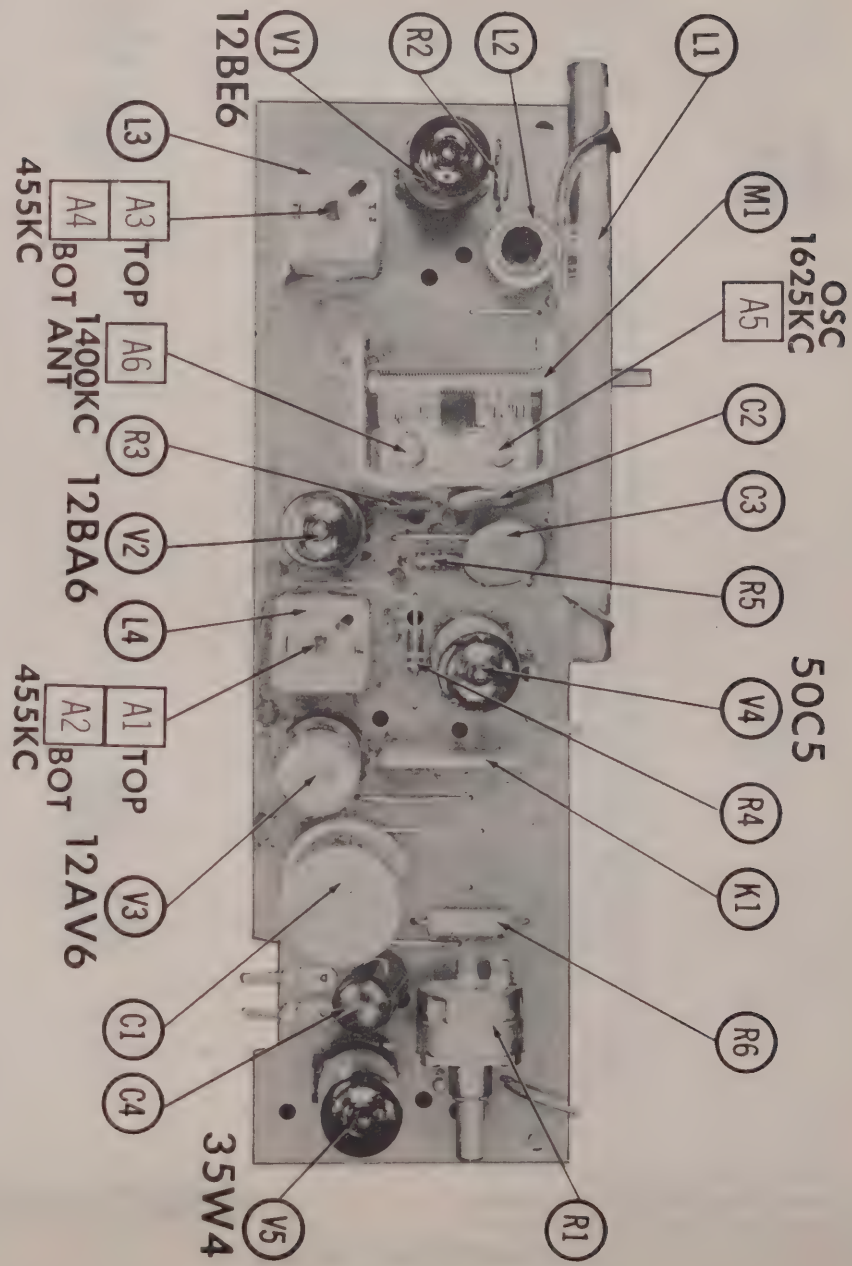
NAME	PART NO.	DESCRIPTION
Knob	550V088H03	Tuning
Knob	550V096H02	Volume-On-Off
Cabinet	513V036H03	Coral & White, Model H-681T5
Cabinet	513V036H01	Aqua & White, Model H-682T5
Cabinet	513V036H02	Charcoal & White, Model H-683T5
Front Panel	558V183H01	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—TOP VIEW



PHOTOFACT* Folder

ZENITH MODELS SRS10, E, R, H, SRS15, E, R (Ch. 5B24)

ZENITH MODELS SRS10, E, R, H, SRS15, E, R (Ch. 5B24)

MODEL SRS15

ZENITH MODELS SRS10, E, R, H, SRS15, E, R (Ch. 5B24)

TRADE NAME	Zenith Models SRS10, SRS10E, SRS10H, SRS10R, SRS15, SRS15E, SRS15R (Ch. 5B24)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 5 Tube Audio Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 71 Watts, .62 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amplifier	6AT6
V2	AF Amp. -Phase Inv.	12AU7
V3	Output	EL84/6BQ5

ITEM No.	USE	TYPE
V4	Output	EL84/6BQ5
V5	Rectifier	5Y3GT

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	450	22-3046	AFH3-43-50	C0344	FP376.9	TMT-39	TVL-3786	
B	▲40	450							
C	▲20	350							
C2	10	25	22-3076	PWE25010	BBR10-25	TT50X10	TD-10-25	TE-1024	
C3	3	30NP	22-2945①	NP-PRS50V4	BBR8-150 †	TC504	ML6-50	TVAS-1512*	
					BBR8-150 †		ML6-50†		

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
† Connect Negative Leads Together.
① Part of SP2.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	4700	1000		22-14	HVD454700	DD-472	BYA10D47M	B-247	5HK-D47	
C5	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C6	2200		10%	22-18	DI-2200			JL-222	5BF-D22	
C7	2200		10%	22-18	DI-2200			JL-222	5BF-D22	
C8	330		10%	22-2309	1469-00033	D6-331	5R5T33		MS-333	
C9	3300		10%	22-2670	DI-3300			JL-233	5BF-D33	
C10	.1	600		22-2782	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C11	100		10%	22-9	DI-100	DD-101	LI0T1		MS-31	
C12	.0068	200	10%	22-2819	P288N-0068	D6-682	CUB6D68	GEM-6268	6TM-D68	
C13	.0068	200	10%	22-2819	P288N-0068	D6-682	CUB6D68	GEM-6268	6TM-D68	
C14	.1	600		22-2782	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C15	330		10%	22-2309	1469-00033	D6-331	5R5T33		MS-333	
C16	330		10%	22-2309	1469-00033	D6-331	5R5T33		MS-333	
C17	47		N75 10%	22-2376						
C18	47		N75 10%	22-2376						

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	63-4065	B-69	A47-1meg-S	Q11-137	U-54	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	1meg	½	63-4064	B-70	A47-1meg-Z	Q13-137	U-53	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	10K	½	63-4066	B-14	A47-10K-S	Q11-116	U20	Presence
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	50Ω	2(WW)	63-4068①	WN-500	A43-50	W11-050	R50L	Bias
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	

①Part #63-4402 may be used in some versions.

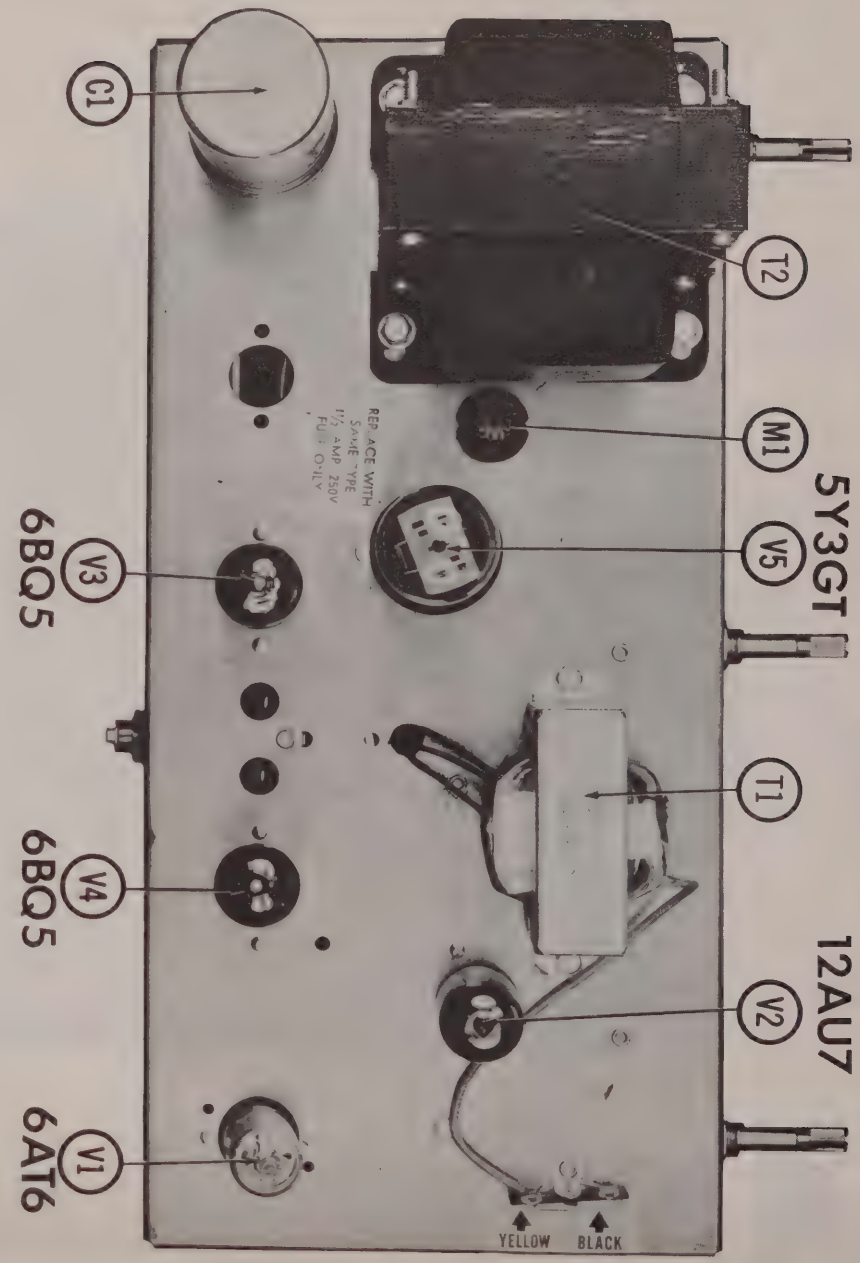
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R5	1meg		63-1912	
R6	100K		63-1870	
R7	1000Ω		63-1786	
R8	270K		63-1887	
R9	82K		63-1866	
R10	47K		63-1855	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R11	2200Ω		63-1799	
R12	22K		63-1841	
R13	470Ω		63-1771	
R14	100K		63-1869	
R15	150K		63-1876	
R16	150K		63-1876	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R17	47K		63-1855	
R18	2200Ω		63-1799	
R19	1000Ω		63-1786	
R20	135Ω 5%	2	63-4397	
R21	1000Ω		63-1786	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R22	330K		63-1891	
R23	330K		63-1891	
R24	4000Ω	3	63-4069	
R25	5600Ω		63-1817	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .62A	700 VCT ⓐ .085A	5V ⓐ 2A	95-1603	P9310①			PC8409①	24R04U①	R-11A①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.1	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5700Ω CT	60Ω	95-1623							
		SEC 2								
		6-8Ω								

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	QUAM PART No.	NOTES
SP1	12"	PM	6-8Ω	49-852	12A6PA	
SP2	5"	PM	3-4Ω	49-856	5A15TZ4	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1½A 250V	136-32	62-17 15-115*	31201.5 (1½A 250V)	342001	AGC 1½	HKP

* Fuse Holder Cap

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

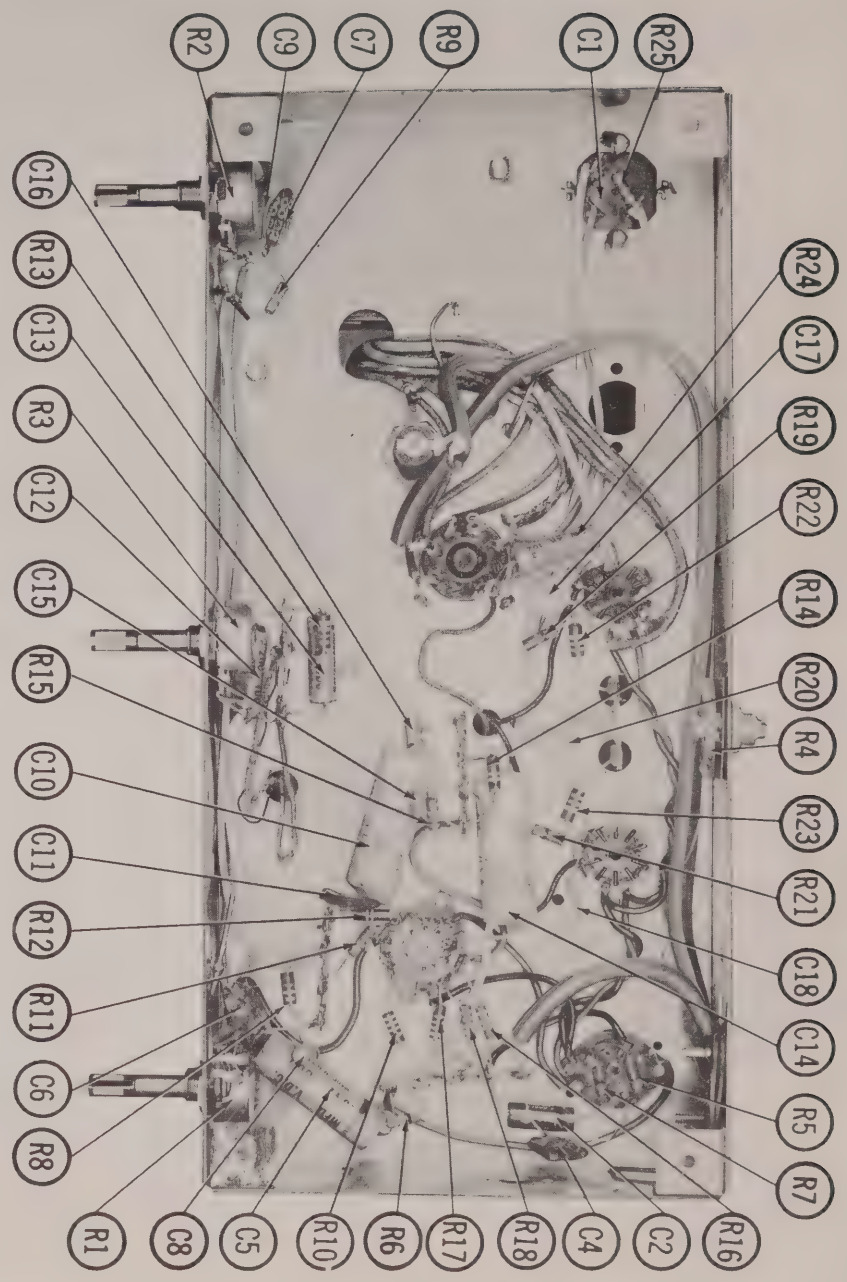
NAME	PART NO.	DESCRIPTION
Knob	46-2081	3 Used
Cabinet	14-2514	Model SRS15
Cabinet	14-2514E	Model SRS15E
Cabinet	14-2514R	Model SRS15R
Cabinet	14-2517	Model SRS10
Cabinet	14-2517E	Model SRS10E
Cabinet	14-2517H	Model SRS10H
Cabinet	14-2517R	Model SRS10R
Leg	96-178	4 Used, Part of Cabinet #14-2514E
Leg	96-201	4 Used, Part of Cabinet #14-2514
Leg	96-177	4 Used, Part of Cabinet #14-2514R

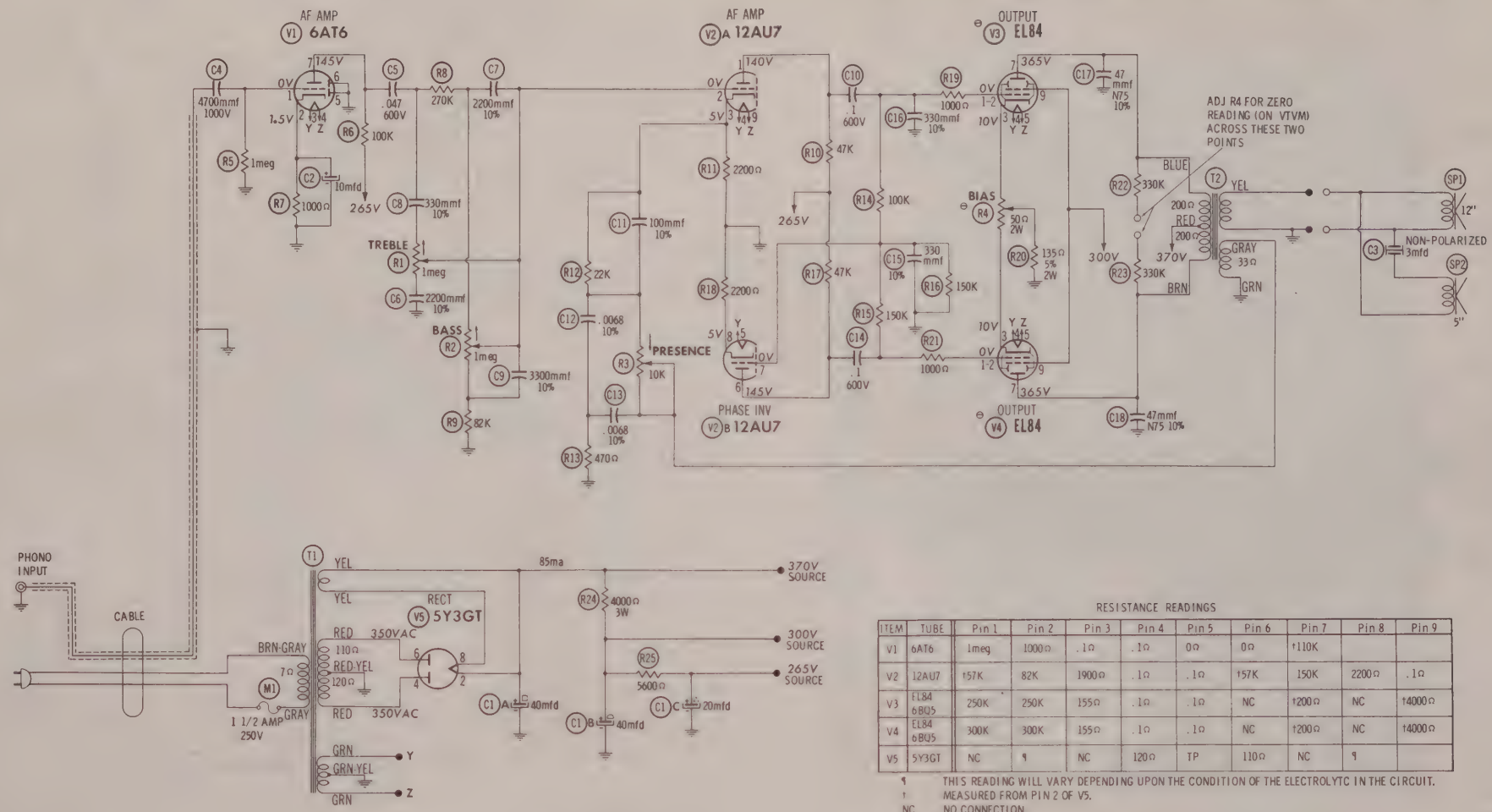
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AT6	1meg	1000Ω	.1Ω	.1Ω	0Ω	0Ω	†110K		
V2	12AU7	†57K	82K	1900Ω	.1Ω	.1Ω	†57K	150K	2200Ω	.1Ω
V3	EL84 6BQ5	250K	250K	155Ω	.1Ω	.1Ω	NC	†200Ω	NC	†4000Ω
V4	EL84 6BQ5	300K	300K	155Ω	.1Ω	.1Ω	NC	†200Ω	NC	†4000Ω
V5	5Y3GT	NC	¶	NC	120Ω	TP	110Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTC IN THE CIRCUIT.
† MEASURED FROM PIN 2 OF V5.
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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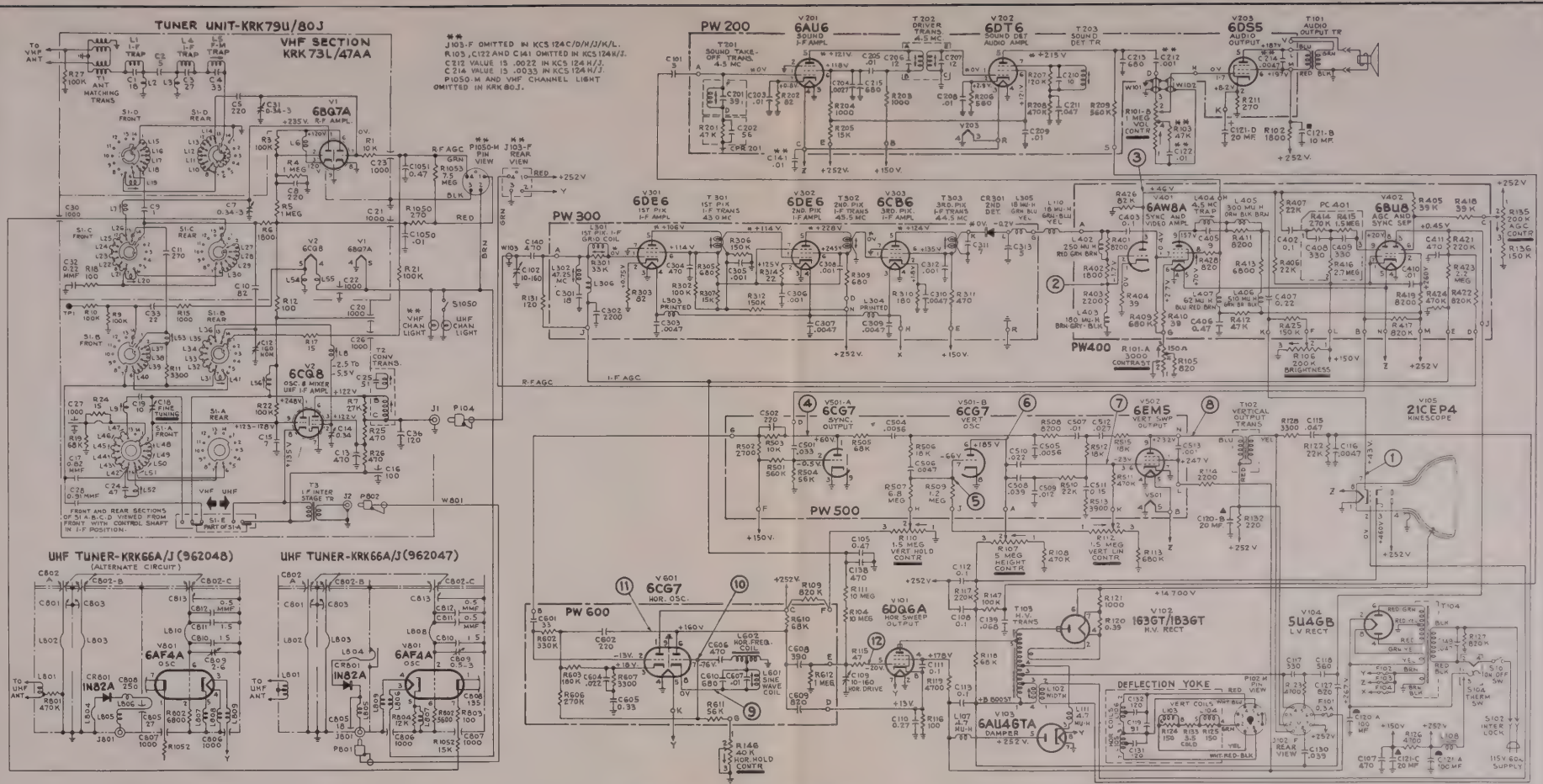
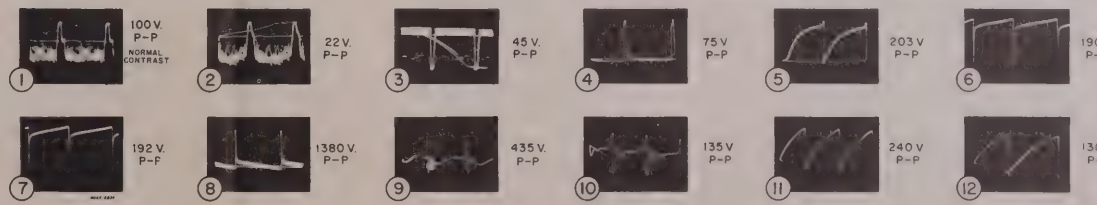
ZENITH MODELS SRS10, E, R, H, SRS15, E, R (Ch. 5B24)



Tuners KRK80F & KRK81J

Used on KCS124D, J

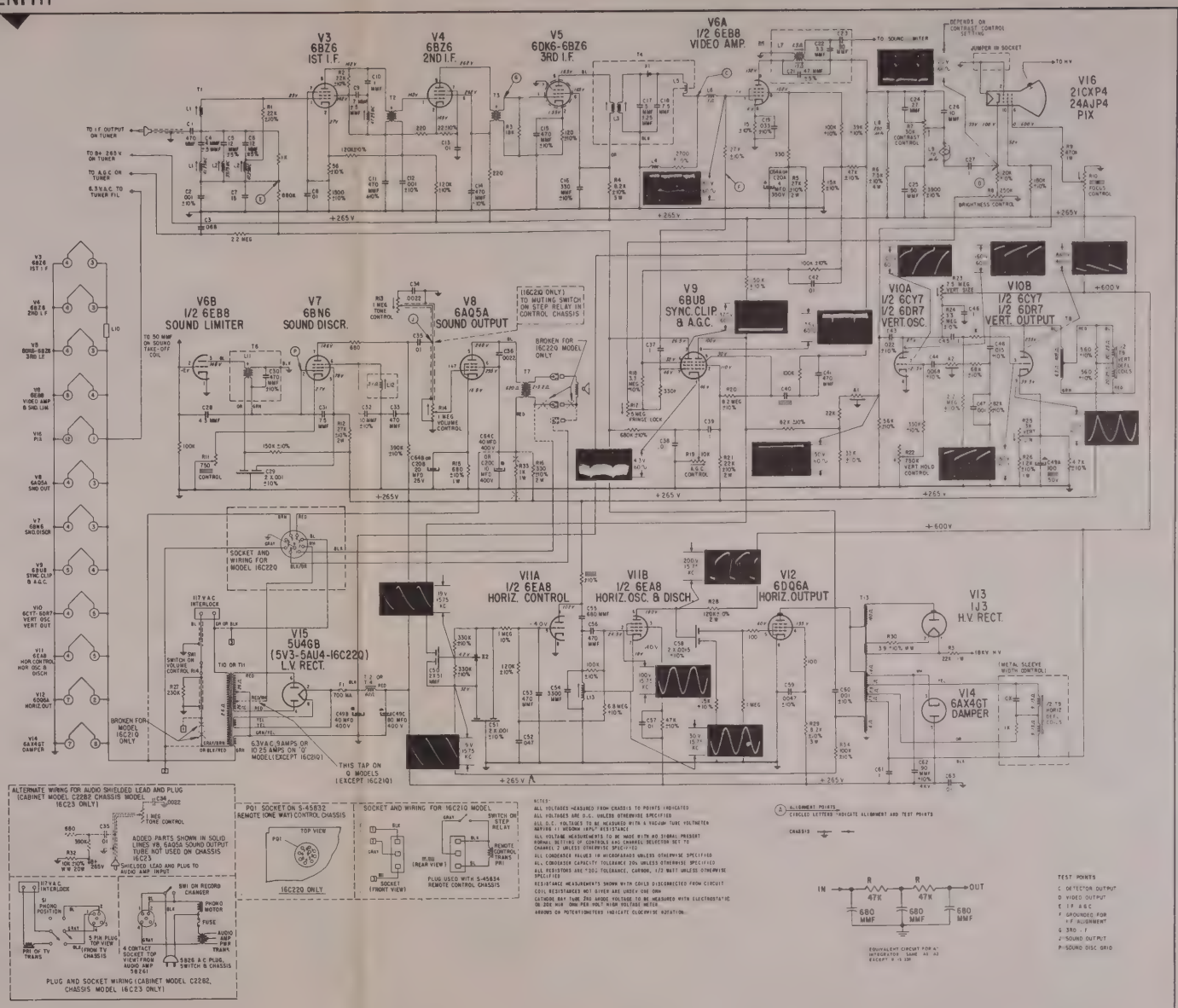
Balloons ① ② etc., shown on schematic above, indicate points of observation of the waveforms shown at the right.



RCA Victor Models 21T9122, U, 21T9125, U, 21T9127, U, 21T9265, U, 21T9266, U, 21T9267, U, 21T9275, U, 21T9276, U, 21T9277, U, 21T9345, U, 21T9347, U (Ch. KCS124C, D, E, F, J, K, L)

Schematic Diagram Courtesy of Radio Corp. of America

Zenith Models B2221RZ, YZ, B2223EZ, RZ, YZ, B2245EZ1, RZ1, WZ1, C2221R, RU, Y, YU, C2223E, EU, R, RU, Y, YU, C2225E, EU, R, RU, Y, YU, C2245E, EU, R, RU, W, WU, C2246E, EU, R, RU, W, WU, C2247E, EU, R, RU, W, WU, C2249H, HU, R, RU, W, WU, C2254E, EU, H, HU, R, RU, W, WU, C2282E, EU, R, RU, W, WU, C2284H, HU, R, RU, C2673E, EU, R, RU, W, WU, C3000E, R, C3001E, R, W, C3004E, R, W, C3006E, R, W, C3007E, R, W, C3008R, C3009E, W, Y (Ch. 5B26, 5B28, 16C21, Q, U, Z, 16C22Q, 16C23, U, 16C24, U)


V3 6BZ6 1ST I.F.
V4 6BZ6 2ND I.F.
V5 6DK6-6BZ6 3RD I.F.
V6A 1/2 6EB8 VIDEO AMP.
V16 21CXP4 24AJP4 PIX
V6B 1/2 6EB8 SOUND LIMITER
V7 6BN6 SOUND DISCR.
V8 6AQ5A SOUND OUTPUT
V9 6BU8 SYNC. CLIP. & A.G.C.
V10A 1/2 6CY7 1/2 6DR7 VERT. OSC.
V10B 1/2 6CY7 1/2 6DR7 VERT. OUTPUT
V11A 1/2 6EA8 HORIZ. CONTROL
V11B 1/2 6EA8 HORIZ. OSC. & DISCH.
V12 6DQ6A HORIZ. OUTPUT
V13 1J3 H.V. RECT.
V14 6AX4GT DAMPER
V15 5U4GB (5V3-5AU4-16C22Q) L.V. RECT.
+265 V
+600 V
SOCKET AND WIRING FOR MODEL 16C22Q
BROKEN FOR MODEL 16C21Q ONLY
THIS TAP ON Q MODELS (EXCEPT 16C21Q)
ALTERNATE WIRING FOR AUDIO SHIELDED LEAD AND PLUG (CABINET MODEL C2282 CHASSIS MODEL 16C23 ONLY)
ADDED PARTS SHOWN IN SOLID LINES V9, 6AQ5A SOUND OUTPUT TUBE NOT USED ON CHASSIS 16C23
SHIELDED LEAD AND PLUG TO AUDIO AMP. INPUT
PLUG AND SOCKET WIRING (CABINET MODEL C2282, CHASSIS MODEL 16C23 ONLY)
P01 SOCKET ON S-45832 REMOTE TONE WAY) CONTROL CHASSIS
16C22Q ONLY.
SOCKET AND WIRING FOR 16C21Q MODEL
PLUG USED WITH S-45834 REMOTE CONTROL CHASSIS
TEST POINTS
C DETECTOR OUTPUT
D VIDEO OUTPUT
E I.F. AGC
F GROUNDED FOR I.F. ALIGNMENT
G 3RD I.F.
J SOUND OUTPUT
P SOUND DISC GRID

Schematic Diagram Courtesy of Zenith Radio Corp.

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The PHOTOFACT Servicer

SET 444 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JUNE 1959

CONTENTS PHOTOFACT SET 444

TRADE NAME AND MODEL	SET AND FOLDER NO.
TELEVISION RECEIVERS	
MOTOROLA A21K106B, M, A21T60BG, CH, MG, Y21K107B, M, 21K107B, M (Ch. TS-553, Y, WTS-553)	444-1
MUNTZ 21LTS, 24LTS (Ch. J)	444-2
PRODUCTION CHANGE BULLETIN	
EMERSON Television Rec. 1254, 1255, 1258, 1259, 1264, 1265, 1266, 1268, 1269, 2064, 2065 (Ch. 120341H, 120342R, 120347H, 120348R, 120358H, 120359R, 120384H)	444-3
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H. H. SCOTT 311-C	444-3
SPARTAN Television Rec. U24-05AA, -07AA, -08AA, V24-05AA, -07AA, -08AA	444-3
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ARVIN 3582 (Ch. 1.44700)	444-5
FISHER 30C	444-6
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LAFAYETTE LA-90	444-8
PA-62	444-9
MAGNAVOX Chassis AMP-176BA	444-10
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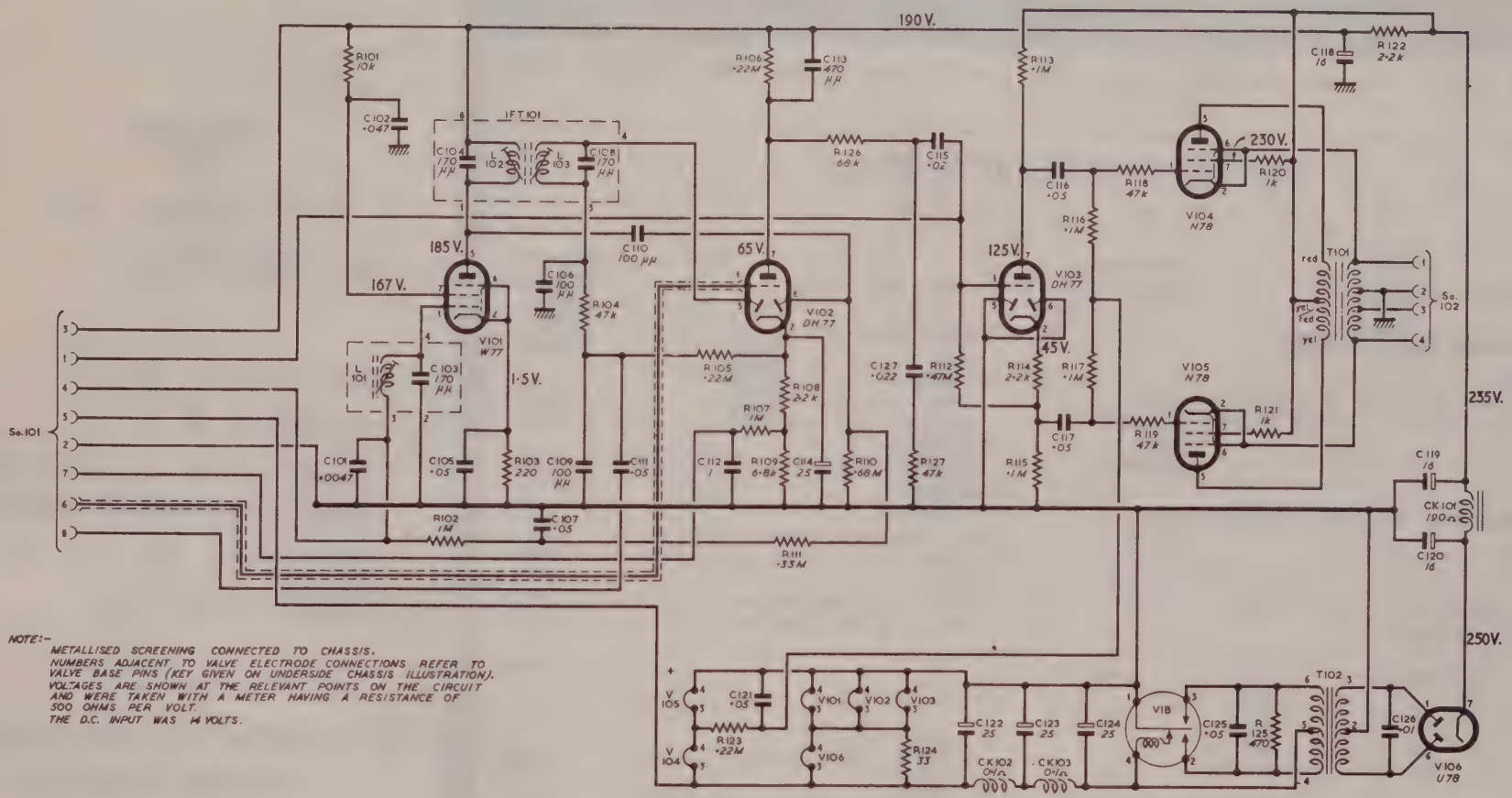
ZENITH SRS10, E, R, H, SRS15, E, R (Ch. 5B24)	444-22

This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

S. Smith & Sons, Ltd.
Models B, D, E
Models 20X6, 12, 22X6, 12
Models 202X(12V), 203X(6-12V)
Models XA, XB, XC, XD
Models 230R, 231R

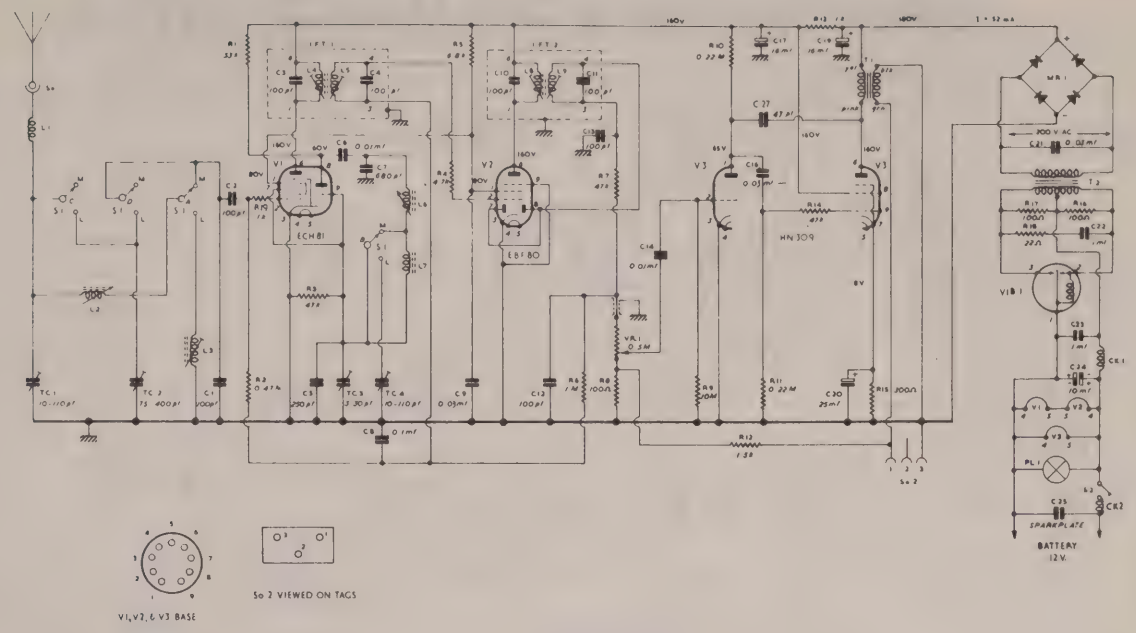
U. S. Importer of above Equipment:
Nisonger Sales Co.
125 E. Main St.
New Rochelle, N. Y.



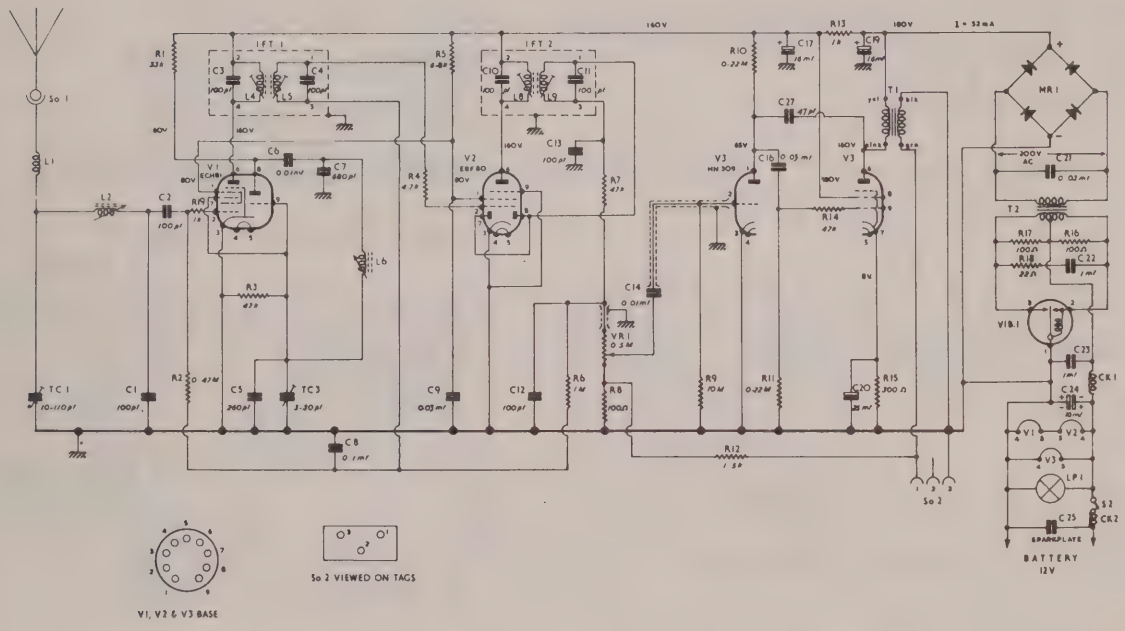
NOTE:—
METALLISED SCREENING CONNECTED TO CHASSIS.
NUMBERS ADJACENT TO VALVE ELECTRODE CONNECTIONS REFER TO VALVE BASE PINS (KEY GIVEN ON UNDERSIDE CHASSIS ILLUSTRATION).
VOLTAGES ARE SHOWN AT THE RELEVANT POINTS ON THE CIRCUIT AND WERE TAKEN WITH A METER HAVING A RESISTANCE OF 500 OHMS PER VOLT.
THE D.C. INPUT WAS 14 VOLTS.

S. Smith & Sons, Ltd. Models B, D, E (Audio Amplifier)

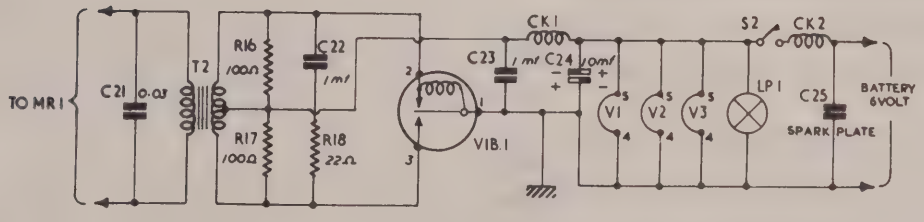
Schematic Diagram Courtesy of S. Smith & Sons, Ltd.



MEDIUM AND LONG WAVE RECEIVER MODEL 20X/12



MEDIUM WAVE RECEIVER MODEL 22X/12

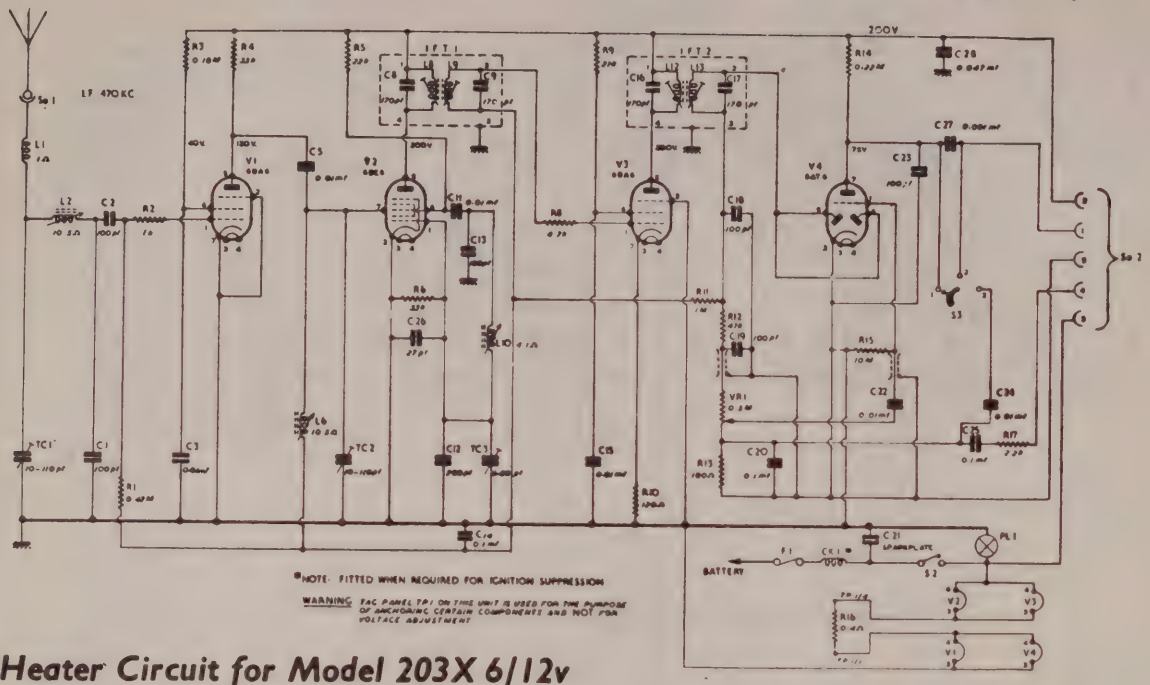


HEATER CIRCUIT FOR 6 VOLT MODELS.

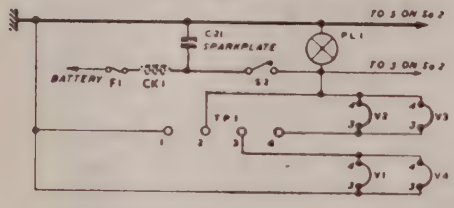
S. Smith & Sons, Ltd.
Models 20X6, 20X12, 22X6, 22X12

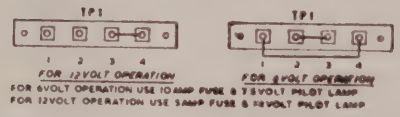
Schematic Diagram Courtesy of
S. Smith & Sons, Ltd.

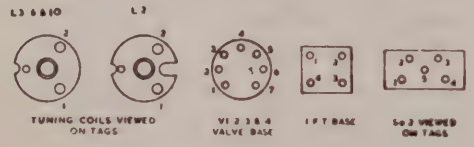
Push Button Control Unit Model 202X (12 v)


LF 470 KC
200V
BATTERY
*NOTE- FITTED WHEN REQUIRED FOR IGNITION SUPPRESSION
WARNING TAG PANEL TP1 ON THIS UNIT IS USED FOR THE PURPOSE OF ARRANGING CERTAIN COMPONENTS AND NOT FOR VOLTAGE ADJUSTMENT

Heater Circuit for Model 203X 6/12v

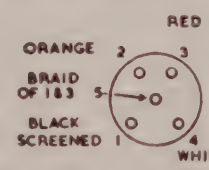



TP1
TP1
FOR 12 VOLT OPERATION
FOR 6 VOLT OPERATION
FOR 6VOLT OPERATION USE 10 AMP FUSE & 7.5 VOLT PILOT LAMP
FOR 12VOLT OPERATION USE 5AMP FUSE & 12 VOLT PILOT LAMP

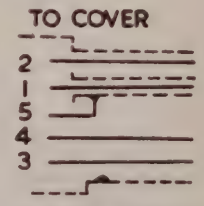


See following page for amplifiers used with this Rf Tuner section.

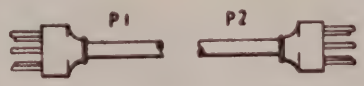
INTERCONNECTING CABLE



P1 & P2 VIEWED ON PINS



P1 & P2 WIRING CONNECTIONS



TOTAL BATTERY CONSUMPTION

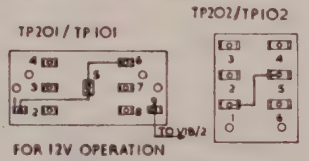
12 Volt Operation

Control Unit with Standard Amplifier	3·25 amps (14 volt input)
Control Unit with De-Luxe Amplifier	3·5 amps (14 volt input)

6 Volt Operation

Control Unit with Standard Amplifier	7·6 amps (7 volt input)
Control Unit with De-Luxe Amplifier	7·9 amps (7 volt input)

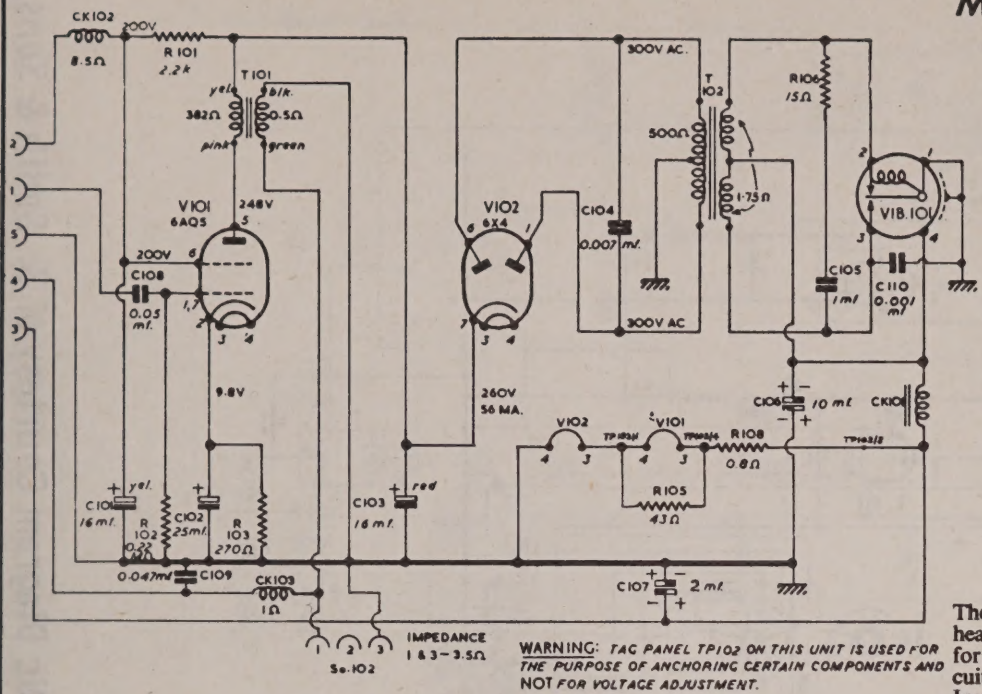
VOLTAGE ADJUSTMENT



S. Smith & Sons, Ltd.
Models 202X (12V), 203X (6-12V)

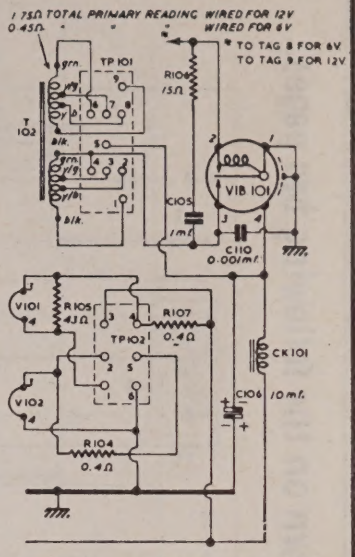
Schematic Diagram Courtesy of
S. Smith & Sons, Ltd.

Power/Amplifier Model XA (12 Volt)



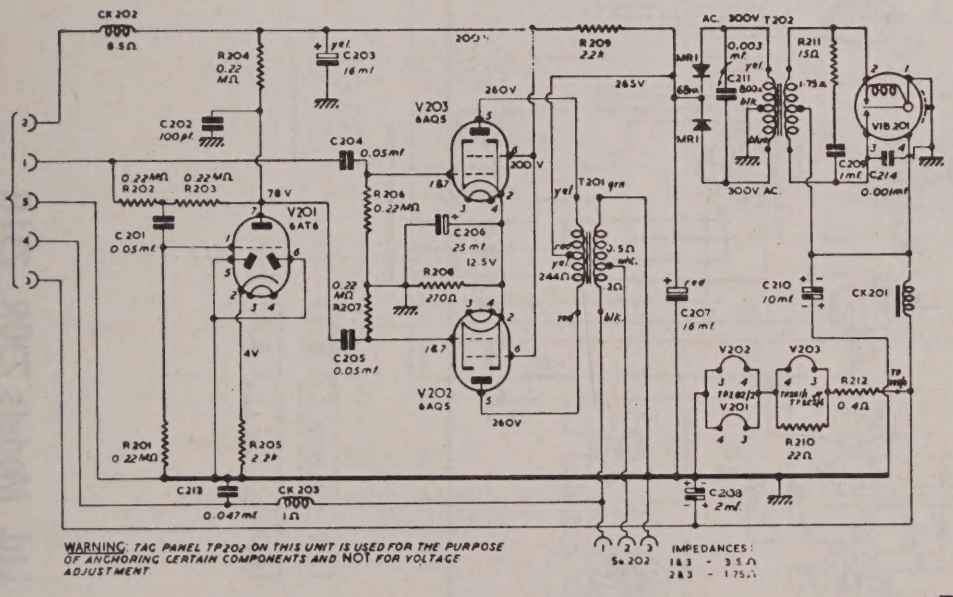
WARNING: TAG PANEL TP102 ON THIS UNIT IS USED FOR THE PURPOSE OF ANCHORING CERTAIN COMPONENTS AND NOT FOR VOLTAGE ADJUSTMENT.

H.T. & Heater Circuit Model XC—6 & 12 Volt



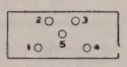
The circuit shown illustrates the valve heater and vibrator circuit arrangement for this unit. The remainder of the circuit is the same as that for model XA. Instructions regarding the conversion of the unit to either 6 or 12 volt operation may be found under Voltage Adjustment.

Power/Amplifier Model XB (12 Volt)



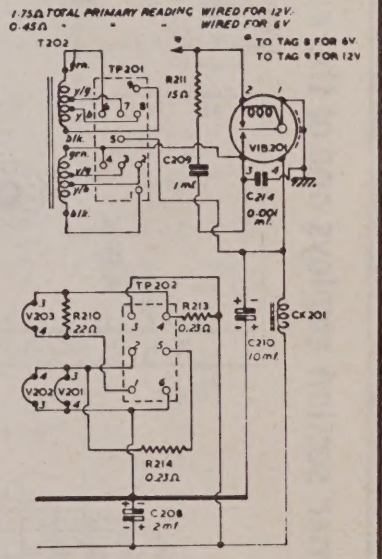
WARNING: TAG PANEL TP202 ON THIS UNIT IS USED FOR THE PURPOSE OF ANCHORING CERTAIN COMPONENTS AND NOT FOR VOLTAGE ADJUSTMENT.

So 202/So 102 VIEWED ON TAGS



So 201/So 101 VIEWED ON TAGS

H.T. & Heater Circuit Model XD—6 & 12 Volt

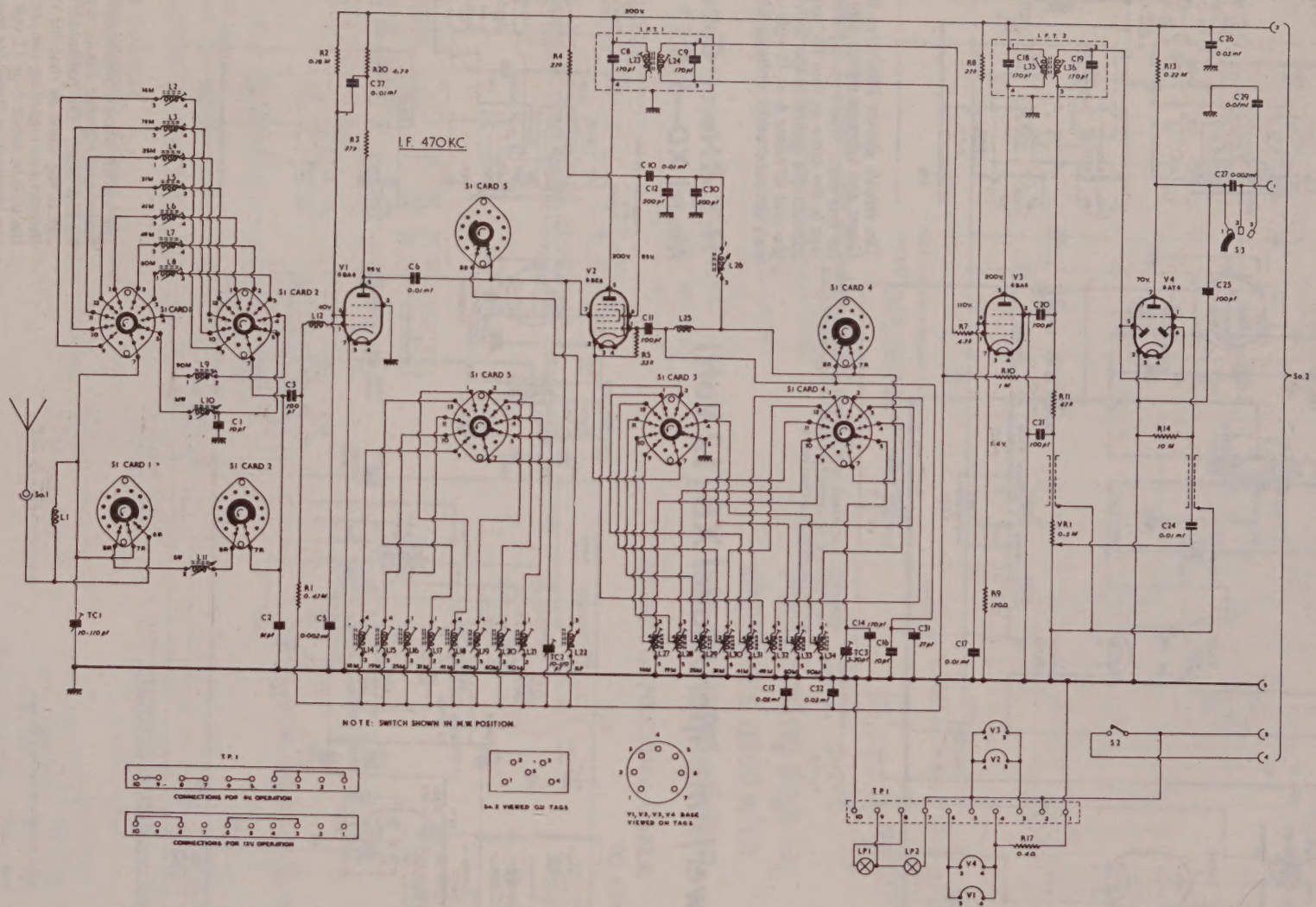


The circuit shown illustrates the valve heater and vibrator circuit arrangement for this unit. The remainder of the circuit is the same as that for model XB. Instructions regarding the conversion of the unit to either 6 or 12 volt operation are identical to those for model XC.

S. Smith & Sons, Ltd.
Models XA, XB, XC, XD

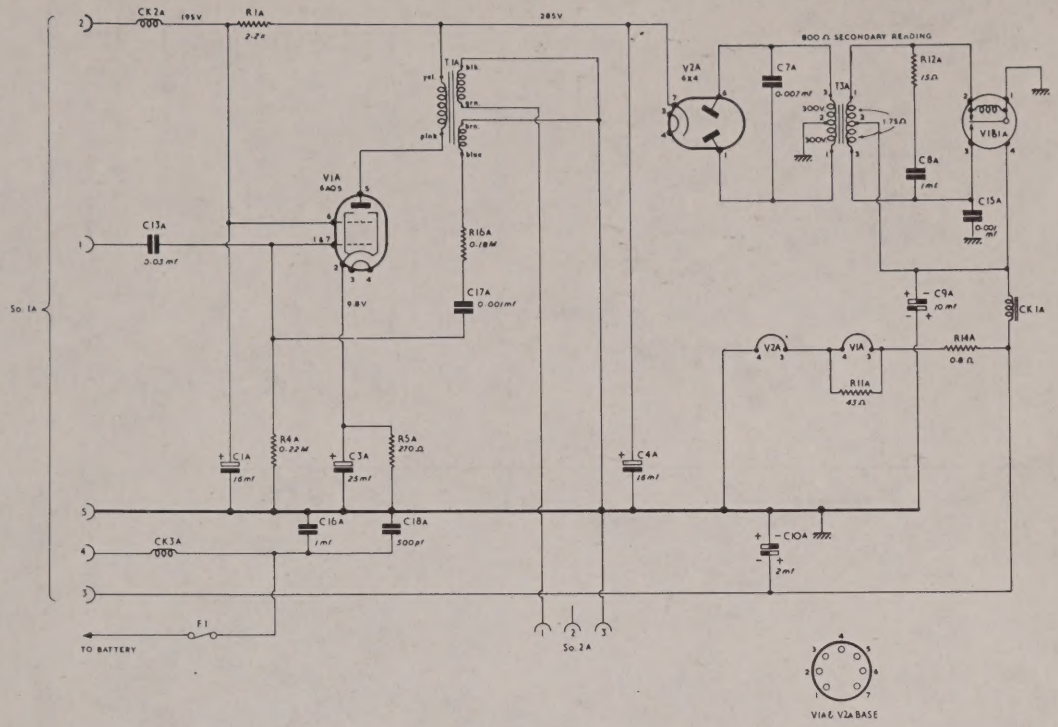
Schematic Diagram Courtesy of S. Smith & Sons, Ltd.

This Rf Tuner section employs one of the audio chassis shown on the following two pages.

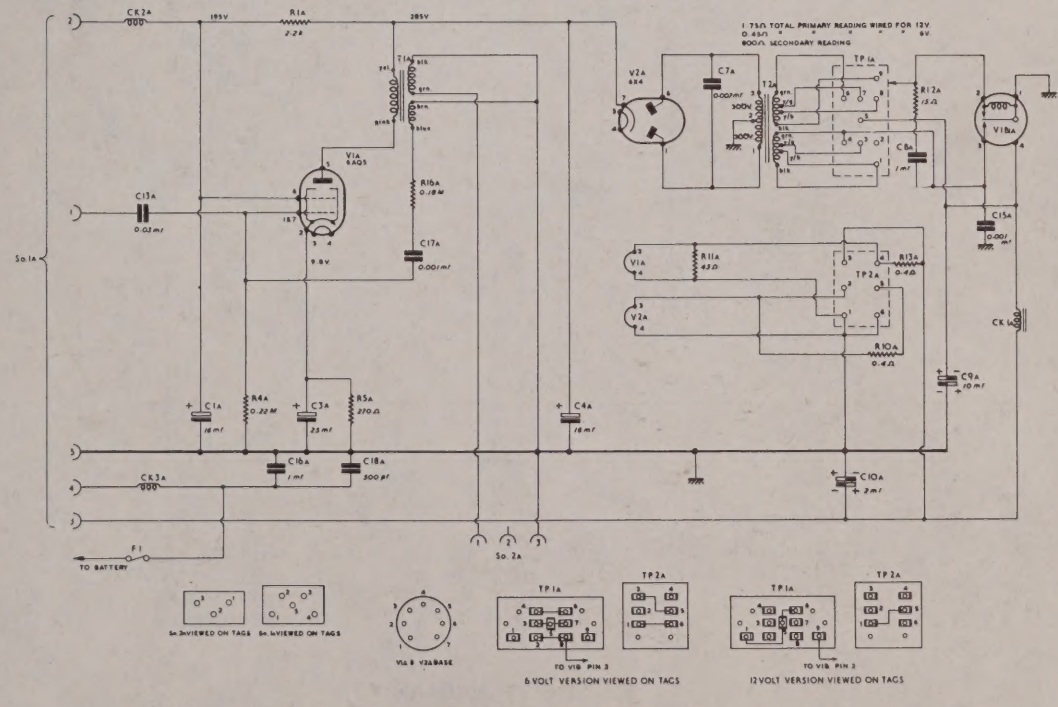


S. Smith & Sons, Ltd. Models 230R, 231R

Schematic Diagram Courtesy of S. Smith & Sons, Ltd.



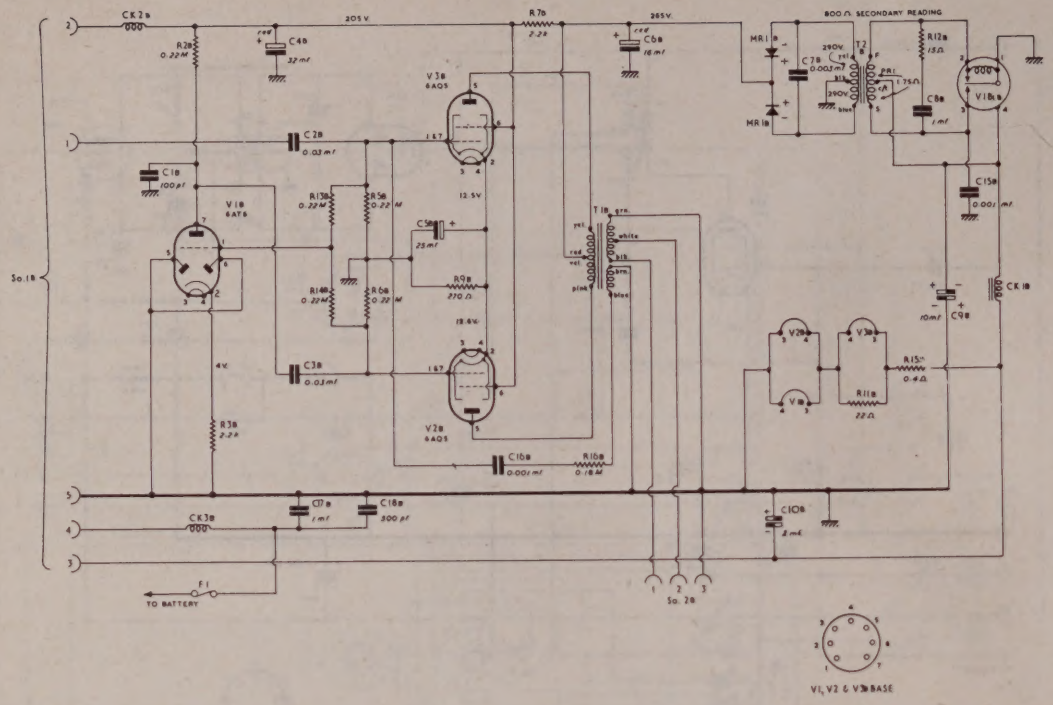
RA CIRCUIT DIAGRAM



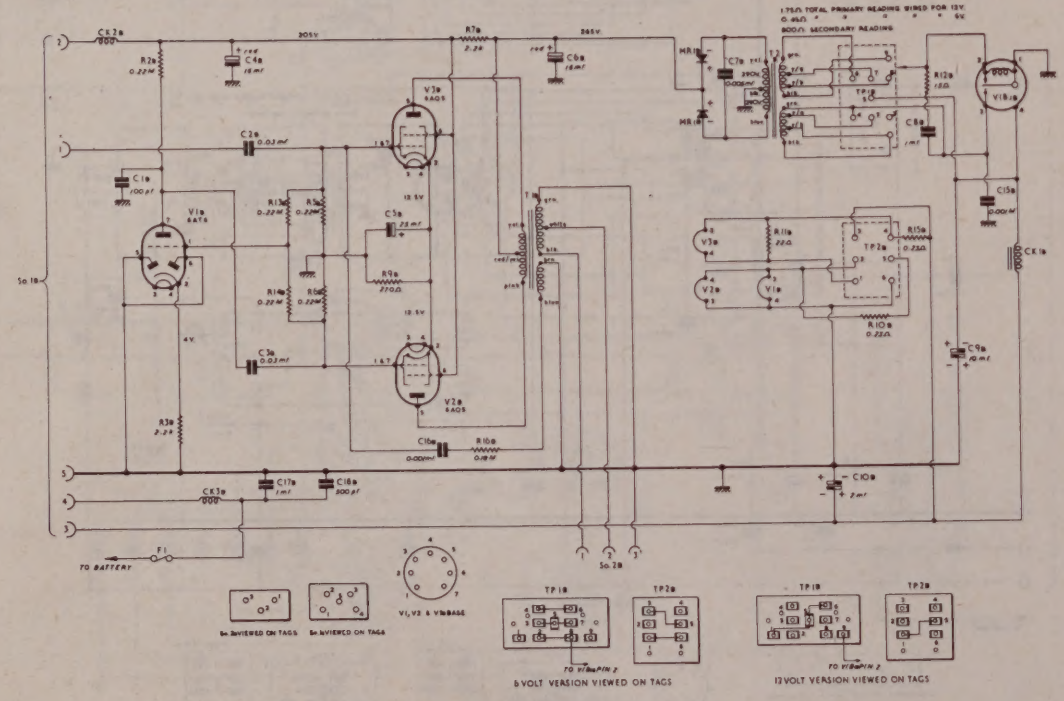
RC CIRCUIT DIAGRAM

S. Smith & Sons, Ltd.
Models RA, RC

Schematic Diagrams Courtesy of
S. Smith & Sons, Ltd.



RB CIRCUIT DIAGRAM



RD CIRCUIT DIAGRAM

S. Smith & Sons, Ltd.
Models RB, RD

Schematic Diagrams Courtesy of
S. Smith & Sons, Ltd.